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ABSTRACT

Papers in this report were presented at a conference on text characteristics, convened as part of the Learning from Text Project. The foreword describes the University of California and California State University Joint Projects Steering Committee project to determine the relationship between ability to learn from text and academic achievement, and gives an overview of the conference. This is followed by opening remarks by the co-chair of the Joint Projects Steering Committee. The major portion of the report consists of articles that discuss the following: (1) a preliminary collateral research report on the Learning from Text Project, (2) the impact of training in underlining on course achievement, (3) investigation of matrix groupings of student/text interaction based on extraneous underlinings, (4) the effect of ethnicity and socioeconomic status on college student achievement when combined with other predictive factors, (5) adjunct questions and text learning in college biology, (6) the effects of cognitive mapping on reading comprehension and written protocols, (7) direct instruction in metacognitive strategies, (8) a summer workshop for learning from text, (9) friendly texts, (10) a text evaluation checklist, (11) text properties that can inhibit the growth of meaning, (12) a workshop on application of criteria for evaluating texts, (13) application of criteria for evaluating texts, (14) learning assistance centers and the testing project at University of California at Los Angeles, and (15) the effects of two types of learning from text guides on the comprehension of psychology texts among college freshmen. (HTH)

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Learning from Text:
Selection of Friendly Texts

Edited by
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Lake Arrowhead Conference on Learning from Text, July 27-29, 1983.

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Foreword

The Learning from Text Project (LFT), funded by the University of California and California State University Joint Projects Steering Committee, has been working on two charges. It completed the first charge: To determine the relationship between ability to learn from text and achievement. It is still working on the second charge: To demonstrate ways of improving freshmen students' abilities to learn from text in various disciplines (Singer and Bean, 1983). To meet the requirements of the second charge, the LFT Project has been systematically investigating the major classroom components underlying achievement at the university level. These components are student resources, instructional strategies, text characteristics, and learning goals, frequently defined by texts.

Student Characteristics on Learning from Text

In the first year of the LFT Project, Singer and Bean (1982) reported that three factors predicted freshman achievement: high school grade point average (background knowledge), Sequential Test of Education Progress, Step 1A Reading (ability to learn from text), and California Survey of Study Methods (attitudes toward learning; confidence in ability to learn). A contrastive analysis of high vs. low students on ability to learn from text indicated that the students differed on (a) depth of vocabulary and (b) ability to answer multiple or complex comprehension questions. They did not differ on learning from text when the questions involved single step cognitive processes. But when the comprehension task required them to answer a complex question that had to be analyzed into its several parts and the answer to each part was a prerequisite for the next part, the groups differed significantly. In short, the students who were successful on this task had to direct and monitor their own cognitive processes as they reread or searched through the passage for answers to the test-posed complex question, have confidence in their answers to each part of the question, and judge which category of the multiple choice answers was congruent with their answer to the question. In other words, the two groups did not differ in their cognitive processes (inference, interpretation, and evaluation), but in their metacognitive processes, their ablity to direct and monitor their cognitive processes, evaluate the outcome, and have confidence in the result at each part of a multiple process. Thus, the difference between the two groups were in their knowledge structures, as assessed by vocabulary test, also known as schemata (Anderson, Montague, and Spiro, 1977; Rumelhart, 1984) and in their metacognitive processes (Flavell, 1977; Baker and Brown, 1984). Apparently, affective components, such as confidence in ability to learn from text, that differentiate good and poor readers at the university level begin to do so as early as junior high school; Athey and Holmes (1969) found they play the same role in reading at the ninth grade level.

Strategies on Learning from Text

In the second year of the project, we concentrated on having professors teach metacognitive strategies on learning from text to freshman students enrolled in English, history, psychology, and botany classes. These strategies, taught in conjunction with the content of the courses, were mapping text, constructing graphic organizers for text, relating concepts to current experience, and utilizing questions inserted in text (Singer and Bean, 1983; Crawford, 1983; Donlan, Singer & Cortes, 1982; Donlan and Tzeng, 1983; Ruddell and Boyle, 1984). In addition, we found that high school students in a history class who are likely to enroll in a university after graduation from high school, could acquire these strategies and improve in their ability to learn from text (Bean, Singer, Sorter and Frazee, 1982, 1983). The long-range plan is to monitor these students' achievement at the university to determine whether their instruction in learning from text at the high school results in significantly higher achievement in their university history classes.

Overview of the Conference on Friendly Texts

In the third year of the project, we held the current conference on text characteristics. We started the conference on Wednesday evening with welcome remarks by Dr. Michael Hoffman, Professor of English at UC Davis and co-chair of the Joint Projects Steering Committee. We then had a series of brief reports on campus projects conducted during the previous years. They focused on strategies for learning from text. Dr. Dan Donlan, UC Riverside, reported on his project with Dr. Ovid Tzeng, on teaching introductory psychology students to learn psychological concepts by relating them to their current experiences outside of class. In other words, students were to identify from their everyday activities exemplars or instances for concepts or schemata presented in class. Professors Donlan and Tzeng wanted to know whether this application of concepts would enhance students' abilities to better comprehend their psychology texts and retain knowledge in memory longer than students who did not utilize this instructional strategy. Dr. Alan Crawford, Professor of Education at CSU Los Angeles, summarized two research projects: (1) a pilot study on teaching bilingual students to comprehend sentences and apply this knowledge to their textbooks and (2) an experimental study in a freshman English class on the effect of knowledge of literary devices on written compositions. Dr. Deborah Hancock, Dean of Education and Dr. James George, Dean of General Studies at CSUC Bakersfield, told about their experiment in Dean George's history class. They wanted to determine whether students would learn to underline text information that coincided with the instructor's definition of what was important in the text and how it would affect their grades in the course. Ms. Nancy Federiuk, Learning Assistance Center, CSUC Bakersfield, analyzed students underlinings that deviated from what instructors thought was important. In other words, the students, not their instructors, thought the information was important. She found that the information they underlined in their texts fit into a matrix of four patterns of interaction between students and texts. Dean Hancock also reported on a statistical study to determine whether the addition of ethnicity and socio-economic status would boost the multiple predictions of freshman achievement over and above the prediction made by high school GPA, STEP Reading, and California Survey of Study Methods: Attitudes. Professor Julius Sassenrath,[1] Education, worked with Professor Hendrik Ketalapper, Botany, UC Davis, to determine whether botany students would perform on their examinations better as a result of responding to questions inserted in their texts. Dr. Robert Ruddell, Professor of Education and Mr. Owen Boyle,[2] Lecturer in Education (Bay Area Writing Project), UC Berkeley, conducted a study on the effect of mapping on students' ability to gather information from text and organize it for writing. The session closed with a summary of the study done by Professors Flood and Diane Lapp, Education, in Professor Raymond Starr's history class at San Diego State University on strategies students use for monitoring their own comprehension in learning from their history texts.

On Thursday morning, Dr. Tom Bean, Associate Director of the Project, and Associate Professor of Education, CSU Fullerton, reviewd the longitudinal study that he is conducting with Harry Singer; Jack Sorter, history teacher at Garden Grove High School; and Dr. Charles Frazee, Professor of History at CSU Fullerton. Mrs. Laura Moore, reading teacher at Anaheim Unified School District, followed with a summary of an inservice project on learning from text that Dr. Bean is directing under contract with the school district.

At the last session on Thursday morning, criteria for analysis of texts characteristics were presented. Dr. Harry Singer briefly reviewed criteria for friendly texts, that is, text characteristics that help readers comprehend them, and extra-text factors of school, student, and teacher that also determine whether a text will be friendly. Tom Bean presented his criteria and scale for evaluating texts. Dr. Judy Langer, Lecturer in Education, UC Berkeley, then pointed out in her paper criteria for inconsiderate text, properties of text that inhibit the construction of meaning as readers interact with text and formulate hypotheses.

In the afternoon, we divided into three groups for workshops on applying text criteria to high school and college texts. Dean Hancock had her group determine the relative friendliness of two anthropology texts. Dr. Donlan's group evaluated social science texts. Dr. Bean's workshop evaluated the friendliness of two philosophy texts.

After the workshops, the groups convened to hear reports from the workshops and applications of friendly text criteria to high school and college texts. Hallie Yopp, Ruth Nolte, and Patricia Phelps, graduate students at UC Riverside, and assistants in the LFT Project presented their analyses of high school history and biology texts. Dr. Arthur Graesser, Professor of Psychology at CSU Fullerton, conducted a comparative study of four scales for measuring text characteristics. He evaluated the relative friendliness of three psychology texts. After a discussion of the results, he concluded with his list of dimensions for evaluating texts. Professor Charles Frazee, Professor of History at CSU Fullerton, stated his own criteria for selecting a history text. Dr. Edward Fry, Professor of Education, Rutgers University, provided the group with general comments on readability. He pointed out that some states now have plain language laws for writing legal documents; he concluded his comments by summarizing his writeability criteria.

On Friday morning, presentations were made on other projects. Ms. Janis Cox, UC Systemwide, informed the group on university-high school relationships. She pointed out that the California Roundtable on Educational Opportunities, which started in 1980, is a voluntary association of all institutions of higher education and prominent businessmen. It meets twice a year to discuss ways of improving education. The Roundtable plans to sponsor conferences throughout the state on mathematics and education and a study of teacher education that focuses on how to make teaching more attractive. She concluded by pointing out that the State of California was beginning to allocate more resources for education, specifically $800,000,000 more this year for curriculum and staff development at the high school level.

Mrs. Betty Levinson, Academic Resource Coordinator, UCLA, spoke on learning assistance centers. She pointed out that the centers differ, but they're all considered to be remedial and receive students by self or professors' referrals. The Centers are funded in UC by student fees and in CSU by state funds, but do not receive budgeted funds for research. They diagnose students' learning difficulties and plan specific improvement programs for them. Then she summarized UCLA's work in relationship to the LFT Project: The Center is using the STEP Reading and California Survey of Study Methods (CSSM) to advise students. About 90 per cent of the students who come to the Center take the STEP Test. The Admissions Office at UCLA uses the STEP and CSSM in making decisions on special action cases. In short, they use these tests as alternative criteria for admitting students. She concluded by reporting on her LFT projects in which students think aloud about their strategies while reading and answering questions on their texts.

The final session dealt with two topics. Dr. Singer reviewed the project with emphasis on its practical applications. He paraphrased a statement made by Kurt Lewin, the well-known psychological theorist, that what is most practical is a good theory, that is, an explanation based on valid knowledge. He stated that the LFT Project has focused on (a) discovering what differentiated good and poor readers, (b) evaluating strategies for teaching all students how to learn from text at a university or theory level of comprehension, (c) determining characteristics of texts that make them more friendly and therefore more comprehensible and memorable, and (d) more diagnostic entry level tests were needed, not for admission, but for use by freshman instructors. He concluded by pointing out that the project was operating and disseminating its results directly on four UC and four CSU campuses and indirectly on all UC and CSU campuses through its mailing of LFT information some 3 to 4 times per year to some 160 UC and CSU faculty and staff.

Professor Michael Hoffman ended the conference with a discussion of the practical uses of the LFT findings in the UC and CSU systems. He then reviewed the State Department of Education's interests in textbook selection criteria and content area diagnostic tests. He concluded by lauding the project staff for its diligent work on the project and for a productive conference.

Harry Singer
University of California, Riverside
July 17, 1984

Footnotes

[1] Professors Sassenrath and Ketalapper could not attend. Neither could Professors James Flood, Diane Lapp and Raymond Starr. Their written reports were presented by Harry Singer.

[2] Professor Ruddell was not present. Mr. Boyle gave the report.

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Welcoming Remarks

by

Michael Hoffman

On behalf of the Joint Projects Steering Committee I'm pleased to be here for the second annual conference of the Learning from Text Project. As I told you last year, I'm delighted at the role this project has assumed among the efforts sponsored by UC and CSU to improve instruction in our two segments and in post-secondary education in California. An exciting new development I can report is that the State Department of Education has agreed to work with us in administering the Mathematics Diagnostic Testing Project. It is our hope that they will also find a way to get involved with you.

Watching a project such as yours mature is an interesting endeavor. I can see by the program and the various publications Harry Singer has sent me that you have moved from your testing phase into the expanded development of intervention strategies. The research also seems better focussed, and I am especially interested in your development of criteria for the selection of textbooks. I believe the State Department may share in that interest.

In your next stage we look for the development of good strategies for disseminating your findings. The Steering Committee is anxious to have you share your ideas with the right people in our campuses, whether they be faculty members, counsellors, admissions officers, or directors of learning assistance centers. In the post-secondary part of your work, I am pleased to see the apparent successes a number of you have had in working with high school teachers. I think that part of your project has a great chance for successful exportation or adaptation on either a local or regional basis. When the time comes, my co-chair, Linda Jones, and I shall be pleased to place the products of your efforts before the appropriate individuals in the State Department of Education.

In the meantime I look forward to working with you at this conference and to educating myself about the specifics of the Learning from Text Project.

Learning from Text Project:
Preliminary Collateral Research Report

by

Alan N. Crawford

California State University,

Los Angeles

Two related collateral research projects were initiated during the 1982-83 academic year. The first was brought to a successful conclusion as a pilot study; the second remains incomplete because of a personnel change and because of difficulties in the scheduling of students into a sequence of courses.

Collateral Research Project I

Purpose of the Project

The purpose of this pilot project was to improve the reading vocabulary and comprehension skills of identified freshman students at California State University, Los Angeles. As a result of testing conducted by the Learning Assistance Resource Center, the students were enrolled in three sections of EDUC 093, a four quarter unit sub-baccalaureate study-skills course. Although they had been identified as students with the potential to complete a degree program, most had entered the university under the auspices of the Educational Opportunities Program (E.O.P.) and did not meet regular entrance requirements.

Subjects

All of the students in the study had freshman status. The final sample was made up of the 55 students who took both pretest and posttest. Forty-two percent were identified as Hispanic, 30% as Asian, 24% as Black and 2% as Other White; 47% were male and 53% were female. The primary language of most of the Hispanic and Asian students was not English, although all had sufficient proficiency in the English language to benefit from the course.

Treatment

The major instructional strategy utilized during the quarter was training in identifying the grammatical components of a sentence through a color coding system. The students were first taught to identify and color code the following grammatical elements in simple sentences: subject, verb, object, adjectival and adverbial clauses, phrases, clauses, and indirect objects. This skill was then applied to selected passages from textbooks used by the students in their other courses, usually either with sentences they could not understand or with sentences which contained important information from the course.

All instruction was conducted by a Professor of Education with thirty years of teaching and research experience in the area of reading. Consultations were also held with the project Co-Director, a Professor of English.

Instrument

The Comprehensive Tests of Basic Skills, Reading, Form O, Level

4, were used to assess changes in reading achievement. The tests yield raw scores and grade equivalents in the areas of Reading Vocabulary, Reading Comprehension, and Total Reading. There are 40 items on the Reading Vocabulary Subtest and 45 items on the Reading Comprehension Subtest.

Design

Changes in the reading achievement of the students were assessed in a pretest-postest design, with a ten week interval between pretest and posttest. A control group was not available for this pilot study. The raw scores of the students were tabulated for analysis. Mean raw scores and standard deviations were calculated; the significance of differences between pretest and posttest scores was assessed with the t-test for related measures. Mean raw scores were also converted to grade equivalents for comparison purposes.

Results

The mean raw Reading Vocabulary scores of the students increased from 20.71 to 23.82, a gain of 9 months in grade equivalent (see Table 1). The difference was significant at the .01 level. The mean raw Reading Comprehension scores of the students increased from 22.16 to 26.44, a gain of 14 months in grade equivalent. The difference was significant at the .001 level. In Total Reading the mean raw scores of the students increased from 42.88 to 50.76, a gain of 12 months in grade equivalent. This difference was also significant at the .001 level.

Table 1

Results on CTBS Reading Test, Level 4, Form S:

Pretest/Posttest

	Pretest			Posttest					
Test	Mean Raw Score	S.D.	G.E.	Mean Raw Score	S.D.	G.E.	Gain	t-ratio	Sig.
Vocab.	20.71	8.19	8.3	23.82	5.28	9.2	.9	-3.02	.01
Comp.	22.16	7.17	7.2	26.44	6.45	8.6	1.4	-5.83	.001
Total	42.88	13.70	7.8	50.76	12.13	9.0	1.2	-5.15	.001

N = 55

Conclusion

The results indicated that the treatment was quite effective in improving the reading skills of these students, as measured by the Reading Vocabulary and Comprehension Subtests of the CTBS, Form Q, Level 4.

Collateral Research Project II

Purpose of the Project

The purpose of this second pilot project was to utilize beginning English composition exercises, applying discussion labels to reading in the rhetorical genre, and to then determine the effect of these activities on written composition. The activities were utilized in three sections of EDUC 093, the same course used in Collateral Research Project I, but in different sections.

Subjects

Sixty-three students were enrolled in the three sections of EDUC 093 during the Fall, 1982, quarter. A description of the subjects cannot be completed at this time because only 19 of the students from EDUC 093 have thus far been able to enroll in the appropriate Freshman English composition course; this was caused by scheduling difficulties.

Treatment

The principal focus of the treatment was the relation of literary devices in short stories taken from Elizabeth Penfield's Short Tales, published by the Scott-Foresman Publishing Company, to reading comprehension skills. Instructional activities included descriptive narration, adding specific details orally to narratives read, making comparisons (identifying similarities and differences), and identifying main ideas (topic sentences). The models used for structuring the reading of the short stories were the same as those to be used for writing compositions in the subsequent Freshman written composition course.

The instructor for these sections of EDUC 093 was a certified reading specialist from the Learning Assistance Resource Center; she left the university after conducting three sections of the course. She worked under the direction of the Project Co-Director, a Professor of English and a nationally recognized expert in written composition.

Instrument

An wholistic rating device will be used to evaluate the written compositions of the subject students.

Results and Conclusions

The students enrolled in the Fall, 1982, sections of EDUC 093 will be tracked until they have completed the Freshman composition requirement. At that time their course grades and data from wholistic analyses of their written compositions will be collected and analyzed.

The Impact of Training in Underlining on Course Achievement

by

Deborah Osen Hancock and James George
California State College, Bakersfield

The UC/CSU Learning from Text Project has worked from the premise that learning from text requires learners to "mobilize their resources to interact with text," according to their changing purposes and demands of the task (Singer & Bean, 1982). Singer and Bean concluded that college level instructors may have to teach their students the metacognitive strategies for comprehending their course texts. To that end they propose that studies be conducted which investigate the effect such instruction can have on student learning.

The History Text Underlining Project conducted at California State College, Bakersfield, is one such study. The project had three objectives: to see how well students were able to identify important concepts and factual material in the course text; to give students an opportunity to see how the course instructor used underlining to identify those concepts and facts; and to see whether the project would significantly improve the experimental group's grades as compared to those of the control group.

Underlining and "highlighting" course texts is an activity frequently engaged in by university students, as a walk through any campus library can quickly verify. Yet a review of 41 studies on the effectiveness of underlining as a study aid (Hartley, Bartlett, and Branthwaite, 1980) showed that only twelve studies provided clear-cut support for this procedure. These studies demonstrated that underlining, whether provided by the experimenter or the learner, is helpful for recalling cued items (specific material). The remaining studies (with one exception) found the effect of underlining to be neutral. In the final study the effect was negative.

The History Text Underlining Project provided training for students in using underlining to identify specific materials from the course text which the instructor considered to be important. By increasing their accuracy in selecting key ideas from the text, students should become more efficient in learning course content related to tests in the course. We predicted that this efficiency would be reflected in higher grades in the course for the experimental group when compared with the control group.

Method

Subjects

The class shown for the project, History 231, Survey of American History to 1865 (5 quarter units). It was a freshman level survey of United States history, which was conducted during the Spring 1983 quarter. The primary reason given by students for enrolling in the class was to satisfy a portion of the "American Institutions" graduation requirement.

Fourteen of the 27 students enrolled at the beginning of the course were randomly selected by the instructor to participate in the project. Twenty-four (24) students completed the course: 4 freshmen, 12 sophomores, 6 juniors, and 2 seniors; 8 males and 16 females. The experimental group included 3 freshmen, 8 sophomores, 2 juniors and 1 senior.

The instructor explained to the class that three times during the quarter one-half of the class would leave 20-25 minutes early in order to permit the other students to engage either in general discussion or in scrutiny of their ability to learn from their course text.

Design

Three times during the quarter (the third week, the sixth week, and the tenth week) the instructor gave the experimental group a four to five page segment of their course text and asked them to underline the important concepts or factual material outside of class in preparation for the next class session. For the first segment they were asked to underline sentences they would consider important or would normally highlight to remember. For the second segment students were asked to underline important concepts or factual material, but in selecting sentences to underline they were to reflect on the instructor's observations concerning their first underlining effort. At each of the three sessions the instructor modeled the process he went through to determine the key sentences in the subject text. For the final segment they were directed to underline important concepts and factual material and to indicate the most and second most important item in each paragraph by placing a number 1 or 2 in the margin.

Material

The course instructor selected the three text segments used in the study from the class textbook, Generations of Americans: A History of the United States, Volume I by Keith I. Polakoff et al. (1981). The instructor selected segments on the basis of their interesting content and their usefulness to the course objectives.

Procedure

One class period before each in-class activity the participants were given the appropriate segment and instructed to underline as explained above. The course met Monday, Wednesday, Friday for ten weeks.

On the day of the in-class activity, the control group members were excused approximately 25 minutes before the end of the 90-minute class session. Before turning to the segments, the instructor generally reminded students why this project was being undertaken: many college students had underdeveloped reading skills, and were unable to identify in assigned course reading the important (as opposed to less important) concepts and factual materials. In addition, students in previous phases of this project who had demonstrated the ability to identify important material in their texts had tended to receive higher grades on tests.

In the first session the instructor, working with an overhead projector, read the assigned segment in front of the class and underlined on transparencies the sentences he identified as important. He asked students to compare their selections with his. Students had a brief opportunity to offer observations or question the key ideas he identified. At the end of the session students handed in their segments to the instructor. Although he reviewed them, he did not provide any further feedback.

At the second session, the instructor had underlined the assigned segment beforehand on transparencies. With each page he asked students if they had chosen the same sentences or items, and if not, why they had selected different ones. Students were given an opportunity to explain their decisions in identifying what they considered to be important material. At the end of the session student segments were again handed in. No additional feedback was provided.

The third session followed the same procedure as the second.

Results and Discussion

Of the 24 Ss, the following distribution per cell resulted: five completed one of the three underlining training sessions, four completed two sessions, five completed three, and ten constituted the control group, which had no such training.

The means and standard deviations for the four groups are given in Table 1. The results of the analysis of variance appear in Table 2.

Table 1

Means and Standard Deviations for the

Underlining Training and No-Training Groups

Conditions	Mean	S.D.
Attended 1 underlining training session	348.8	63.5
Attended 2 underlining sessions	351.5	32.0
Attended 3 underlining sessions	373.4	34.3
No Training	385.6	51.2

Table 2

One-Way Analysis of Variance for Differences Between Underlining Training and No-Training Groups

Source of Variation	df	SS	MS	F
Factor	3	6106.	2035.	0.86
Error	20	47457.	2373.	
Total	23	53563.		

There was no significant difference between underlining training vs no training when compared with the total number of points the students earned in the course (range = 260-474). Points were earned in three class discussions in which students were graded, two tests (multiple choice, short answer, essay), and a final.

This "neutral" effect of underlining training would appear to be consistent with the findings of a majority (27) of the 41 studies of the effects of underlining on learning reviewed by Hartley, Bartlett and Branthwaite (1980). In view of the limited number of students participating in this study, the limited number of training sessions, and the irregular attendance of students at these training sessions, further study of the major hypothesis of this study would seem appropriate.

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Preliminary Investigation
Matrix Groupings of Student/Text Interaction Based on Extraneous Underlinings

by

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One of the important variables in learning from text is the student/text interaction. In this interaction, what a student feels is important in a text is a reflection of that individual's experential background and the text's form and content.

This investigation concentrates on what text material a student feels is important that the course instructor does not. The analysis, then, is based on what the student underlined in a text that the instructor did not (extraneous underlinings).

The preliminary findings indicate there are patterns or trends in this extraneous underlining. Students appear to consistently underline ideas and organizational devices that can be grouped within a matrix to show these patterns or trends.

Data

The students in this preliminary investigation sample were college freshmen through seniors. Over one hundred underlining passages were examined from Deborah Hancock and James George's study: The Impact of Training in Underlining on Course Achievement (1983) and Deborah Hancock's soon to be completed study on underlining and related variables. The text passages ranged from one page to fifty pages and covered the disciplines of History, Math, Religion, Philosophy, and English from the General Education level course to upper division courses.

These ideas and organizational devices are grouped by the type of interaction: (1) the student's individual concerns, (2) the student's social or collective concerns, (3) the text form or organizational devices, and (4) the text content. Figure 1 represents a matrix using the interactions. It is one of many possible matrices, but for purposes of this paper, it seems the most useful.

Idiosyncratic Interaction

This is the interaction between the student's individual concerns and the text form. For example, one student in the study sample underlined all of the names (Thomas Jefferson, Grand Convention); one underlined all of the numbers (1776, 176 million dollars); one underlined just the Roman numerals.

Standardized Interaction

This is the interaction between the student's collective (primarily school) experiences and the text form. Students tend to underline what the text indicates is important through the use of: (1) signal words (i.e., first, second, in conclusion), (2) changes in typeface (italics, boldface), (3) paragraph patterns (topic sentence first) and, (4) any devices that set information apart (quotes, print layout). These are the organizational devices the student has been taught to utilize either formally (study skills/reading courses) or intuitively.

READER

	INDIVIDUAL	COLLECTIVE
Form	Idiosyncratic cell 1	Standardized cell 2
Content	Personal cell 3	Social, Political, Economic cell 4

Fig. 1: Interaction of Reader and Text

Personal Interaction

This is the interaction between the student's individual experiences and the text content. For example, a student underlined everything related to the process of writing because she was writing a book of poetry.

Social Interaction

This is the interaction between the student's collective concerns (social, political, economic) and the text content. For instance, one student underlined all the references to the women's movement at the time of slavery and one student underlined all the references to unemployment during the Great Depression. Both are contemporary social issues.

Some of the examples of this extraneous underlining pattern from James George's study (1983):

Extraneous Underlining	Percentage of Students Who Underlined Text	Matrix Category
"...women were of enormous importance to the movement (slavery).	81%	cell 4
"Lectures and sermons were a third means of furthering the crusade (against slavery)."	44%	cell 2
"They stressed that slaves were denied the right to find religious salvation, to acquire property and be economically successful, to exercise political rights, and to have a stable family life."	44%	cell 4

Extraneous Underlining	Percentage of Students Who Underlined Text	Matrix Category
"The explosive nature of slavery became clear in 1819..."	56%	cell 2
"...the Holy Commonwealth sold the Indian survivors of King Phillip's War into slavery..."	25%	cell 4
"A Massachusetts law of 1637 provided "noe Indian shall come att any towne or howse of the English (without leave) upon the Lord's day,, except to attend publike meetings."	50%	cell 4
"...the marriage of John Rolfe to Pocahontas both symbolized the colonists' hopes for peaceful coexistence and cemented relations with the Indian princess' father, Powhatan."	91%	cell 3
"In May 1787, the Philadelphia meeting - destined to be known as the "Grand Convention..."	100%	cell 2
"Congress was also authorized to raise an army, to borrow money, to coin money, 'to create a federal court system and to make all laws which shall be necessary and proper for carrying into Execution' its enumerated powers."	71%	cell 2
"Complaints familiar during pre-Revolutionary years were heard once more - complaints about luxurious living, licentiousness, declining public virtue, and excessive factionalism."	50%	cell 4
"They finally agreed on a four-year term of office and created an electoral college to select the president. States would choose, in such a manner as their legislators determined, as many electors as they had senators and representatives. The person who received the majority of the votes would become president, and the runner-up, vice president. If no candidate received a majority - and the delegates assumed that few after Washington would achieve such a total - the House of Representatives would make the final choice."	100%	cell 2

In this small sample from James George's underlining study the majority of the extraneous underlinings fell within the standardized and social interaction categories of the matrix with about 5-10% of the students exhibiting idosyncratic or personal interaction underlinings. But these categories are not mutually exclusive. Each student will exhibit extraneous underlinings in a number of different categories.

Discussion

If the student fails to achieve the course goals the instructor has set, it is not necessarily because the student does not understand the goals or has poor study habits. The most interesting and significant implication from this investigation is that there may be method in the students' "madness." The students' system may be ordered and logical. If this is true, it will be much easier to modify students' existing behavior than to start from scratch; however, a systematic way of intervention must be developed. The specific intervention strategies may be positive or negative, general or specific, but require further research to establish and substantiate.

The other implications are related to text writing and text selection. Explicit organizational devices and the use of contemporary issues as examples or illustrations could better facilitate learning from text.

Suggestions for Further Study

1. Are there patterns in student extraneous underlinings?

2. Is there a difference in these patterns among various disciplines (math and history, for example)?
3. If these patterns exist, what intervention strategies are possible? And which strategies would be most effective in better learning from text or achieving course goals?

Summary

In student/text interaction, students do appear to underline organizational devices and ideas in predictable patterns. Learning from text might be better facilitated by addressing these patterns through the use of instructor intervention strategies.

The Effect of Ethnicity and Socioeconomic Status on College Student Achievement When Combined With Other Predictive Factors

by

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Authors of the Final Report of the Learning from Text Project for 1981-82: Conceptualization, Prediction, and Intervention (Singer and Bean, 1982) stated that research conducted in the project supported the conclusion that the best predictor of university students' GPA is a combination of high school GPA, attitude toward learning (as measured by the Carter Study Methods Survey), and reading vocabulary (as measured by the Sequential Test of Educational Progress). These, however, accounted for only 16% of the variation in achievement. As the project report authors observed, further study was needed to account for additional variance.

Since the early 1970's, research studies have investigated the effect of ethnicity and socioeconomic status on achievement in higher education. Holmstrom (1973) studied 185,845 first-time full-time freshmen to determine how low-income students differ from other-income students. Findings indicated that low-income students made slightly lower grade-point averages in college than did other-income students. Wilson (1981) reviewed the performance of minority and non-minority students in four successive freshmen classes as they moved through their degree programs at a highly selective college. The two groups were found to be sharply differentiated with respect to cumulative GPA, despite the fact that graduation rates were comparable.

The present study investigated the hypothesis that a combination of high school GPA, attitude toward learning, learning from text ability, ethnicity and socioeconomic status will account for more of the variance in university students' achievement than the combination of the three predictive factors (high school GPA, attitude toward learning, and learning from text ability) found in the earlier Learning from Text Project (Singer and Bean, 1982).

Method

Subjects

The sample of 26 Ss consisted of students who had completed the STEP reading subtests in one class session during a General Education course in which they were enrolled, who had completed the Carter Study Methods Survey outside of that class and returned it, and for whom university records included data on their ethnicity and parents' income. The sample consisted of fifteen freshmen, nine sophomores, one junior and one senior; it included two males and twenty-four females.

Procedure

The reading and vocabulary subtests of the Sequential Test of Educational Progress (STEP) and Carter Study Methods Survey were administered to students enrolled at California State College, Bakersfield during winter quarter 1983 in ten General Education courses in the following disciplines: Anthropology, Biology, Education, English, History, Mathematics, Philosophy, and Sociology.

Information on ethnicity, parents' income, and cumulative college GPA was obtained from the College Registrar and the Financial Aids Office.

Additional data on ethnicity and socioeconomic status were obtained through responses students made to questions of a demographic nature in a survey which was appended to the Carter Study Methods Survey. Whereas college records coded student ethnicity into nine categories, the survey gave students only five options (black, white, Mexican-American, oriental, other). Likewise, college records gave a more precise indication of current parent income (an annual dollar amount) than the survey, which asked students to respond to the following question:

189. What is your ethnic membership group?

A. White
B. Black
C. Oriental
D. Mexican-American
E. Other

Results and Discussion

The results are shown in Tables 1 and 2 in the form of a correlation matrix and a summary of t-ratios.

Table 1 shows the correlation matrix for the data at Cal State Bakersfield. The highest correlation with cumulative college GPA study used GPA for a single term (Fall 1981) while the present study used the cumulative GPA.

The next highest correlations are also consistent with the earlier study. When compared with cumulative college GPA, CSMS

Table 1

Correlation Matrix for 26 Students at CSC Bakersfield

1983

	ETHNICITY (survey)	ETHNICITY (college data)	CUM COLLEGE GPA	STEP VOC	CARTER ATT	HSGPA	PARENT INCOME (survey)	PARENT INCOME (college data)
ETHNICITY (survey)	1.00							
ETHNICITY (college data)	0.531							
CUM COLLEGE GPA	0.334	-0.407						
STEP VOC	0.329	-0.300	0.416					
CARTER ATT	0.068	-0.392	0.479	0.151				
HSGPA	0.511	-0.426	0.482	0.421	0.069			
PARENT INCOME (survey)	0.136	-0.131	0.020	0.012	-0.175	0.066		
PARENT INCOME (college data)	0.494	-0.306	0.264	0.106	0.026	0.296	0.482	1.00

Abbreviation Definitions

CUM COLLEGE GPA = Cumulative College Grade Point Average, Winter 1983
STEP VOC = STEP Vocabulary subtest
CARTER ATT = CSMS Attitude subtest
HSGPA = High School Grade Point Average

Attitude is also .48 (as compared with .29 for the CSU campuses), and STEP Vocabulary is .42 (compared to .29 for CSU campuses).

The correlations of cumulative college GPA with ethnicity and parent income are also relatively high (.33 and .26) if one uses data obtained from the student survey for ethnicity and data from college records for parent income. The small sample size may account for the negative correlation with ethnicity when college data are used to determine ethnicity (since they spread the responses over nine categories, rather than the five used in the student survey). Perhaps because of the effects of inflation, current parent income appears to be a better predictor of cumulative college GPA than estimated parent income during the high school years of the student which are reported on the survey.

These findings suggest that the question on ethnicity in the current LFT project survey is apparently satisfactory. However, consideration should be given to changing the "Mexican-American" option to "Hispanic," which could make that category somewhat broader, and clarify questions students raised about it during the administration of the survey. The question concerning parent income may need revision. Parent income would appear to be meaningful only for recent high school graduates; so, perhaps, another method of determining socioeconomic status needs to be developed for purposes of the LFT study.

Stepwise regression tests of the effect of the seven variables (including both survey and college data for parent income and ethnicity) consistently showed High School GPA and Carter Attitudes to be the most important predictors of cumulative College GPA. The R^2 for High School GPA was .23, while the R^2 for High School GPA and Carter Attitudes combined was .43. Stepwise multiple regression (Minitab program) stopped after the second predictor.

Analysis of variance tests on several combinations of the predictors yielded significant F ratios. High School GPA, Carter Attitudes, STEP Vocabulary, and survey data on ethnicity and parent income resulted in $F(5,25) = 3.52$, $p<.05$, while the first three predictors when combined with college data on ethnicity and parent income yielded $F(5,25) = 3.68$, $p<.05$. The level of significance for High School GPA, Carter Attitudes and STEP Vocabulary (the major predictors from the earlier LFT study) was $F(5,25) = 6.32$, $p<.05$.

However, the .05 level of significance for a two-tailed t test is reached in each of the three analyses by only one predictor, CSMS Attitudes, and in one test by High School GPA. The t tests for the other parameters are not significant. The standard error on the three analyses ranges from .35 to .37. Table 2 summarizes these data.

The size of the standard error of estimate, when it refers to GPA, should serve as a caution to researchers who are using the factors under study in this project as predictors. In the present study, High School GPA and Carter Attitudes still only account for 16% of the variance in college GPA. Since there appears to be a strong interrelationship between the predictors considered in this study, further research is needed to investigate other factors which could account for more of the variance in college achievement.

Table 2

T-Ratios of College Achievement Predictors at CSC Bakersfield (N = 26)

1983

	First Analysis T-RATIO COEF/S.D.	Second Analysis T-RATIO COEF/S.D.	Third Analysis T-RATIO COEF/S.D.
CARTER ATT	2.32*	2.59*	2.68*
HSGPA	1.84	1.64	2.14*
STEP VOC	1.06	1.08	1.12
ETHNICITY (survey)	-0.09		
PARENT INCOME (survey)	0.38		
ETHNICITY (college data)		0.04	
PARENT INCOME (college data)		0.70	
	df = 20	df = 20	df = 22
Standard error	.3674	.3633	.3519

*p < .05

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Adjunct Questions and Text Learning in College Biology[1]

by

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Abstract

The effect of requiring 132 University of California college students to answer adjunct questions while reading an introductory biology text was investigated. Although no effect was obtained on the midterm, a significant effect was obtained on the final in the course; but only for students who followed instructions by answering the adjunct questions after but not before reading the relevant passages. There were significant differences between the control (no adjunct questions) and only the read after group on the verbal recall, comprehension, constructed, and old (appeared as adjunct question) criterion items, but not on the multiple choice or new items. There was no relationship between the size of the effect and SAT verbal or mathematics scores. It appears that students did not use the adjunct questions appropriately on the midterm. However, after experiencing a difficult midterm, the students who were motivated to use the adjunct questions appropriately performed reliably better. Adjunct questions may be a practical way to improve difficult text learning.

Adjunct Questions and Text Learning in College Biology

The study of adjunct questions has been heavily researched primarily in laboratory type studies under well-controlled conditions with relatively short reading passages (Anderson & Biddle, 1975; Faw & Waller, 1976). However, all of the research and theory that has been developed has led to little, if any, attempts to actually experiment with adjunct questions in a live course. For example, we do not know how effective adjunct questions may be in non-laboratory situations in which the behavior of students cannot be strictly controlled or monitored. Also, we have little knoweldge concerning the effectiveness of adjunct questions in learning a large body of highly conceptual integrated material. Thus, this study, conducted in an introductory biology course, differs from typical laboratory studies in four ways: (1) the duration of the study was much longer, (2) the reading assignments were considerably larger, (3) the text to be learned was more conceptually integrated, and (4) it was not possible to monitor the students as they read the textbook and answered adjunct questions.

Also this study investigated several other issues regarding adjunct questions in the context of prose learning. One of these issues deals with adjunct questions presented before vs. after reading the relevant experimental passages. Apparently, both types of questions can facilitate retention, but post questions are more effective than prequestions (Anderson & Biddle, 1975; Faw & Waller, 1976). We will investigate this issue not by controlling the presentation of questions, but by asking students, after the fact, whether they used the adjunct questions before or after reading the relevant passages.

A second issue is the influence of adjunct questions on those same questions repeated as criterion test items vs. new criterion items. Research (Anderson & Biddle, 1975; Faw & Waller, 1976) has indicated that students have performed much better on repeated (old) than on new test items, as would be expected. In addition, post questions, but not prequestions, facilitated the retention of information in the text that was tested for on new items. This matter has been addressed in the present study.

A third issue is whether multiple choice or short answer constructed questions are preferable. The research (Anderson & Biddle, 1975; Faw & Waller, 1976) on this issue was clear: students performed better when they had constructed questions than they did when given multiple choice questions. In our study we used only constructed adjunct questions, but we examined the issue of whether students performed better on constructed or multiple choice criterion items. Thus, the general purpose of this study was to investigate the several issues mentioned above by using adjunct questions in homework textbook assignments for an introductory college biology course.

Method

Material and Procedure

Adjunct questions. Since adjunct questions were not available for the introductory biology textbook used in the course, it was necessary to write questions keyed to the text. Approximately one question was composed per page of text, resulting in about 400 questions. The questions were composed by graduate students in the botany department, and edited by one of the authors who was also the course instructor (H.K.). The typical adjunct question contained one or two sentences and required a constructed response of one or two words. The adjunct questions, which were printed and bound in workbooks with tear-out pages, were keyed to specific pages and headings of the text.

Adjunct questions covered important concepts, facts, principles, and applications. Approximately 45% of the adjunct questions required verbatim recall. In addition, approximately 25% of the adjunct questions were paraphrased from the text, and 30% dealt with applications not specifically covered in the text. Following Anderson's (1972) method of classifying questions, in our data analysis we considered verbatim questions to be measures of _recall_, while paraphrased and application questions were considered to be measures of _comprehension_.

Students were instructed to read and answer adjunct questions _after_ reading the corresponding section of text. In addition, they were instructed to answer adjunct questions from memory, but to check the text when they were not confident of an answer. Written answers to adjunct questions were handed in weekly. Compliance with instructions was determined with a questionnaire which students completed at the end of the course.

Midterm and final examinations. Our criterion measures were composed of questions on midterm and final examinations covering material from the textbook. On each examination there were 68 questions covering textbook material. These questions were classified along three dimensions. First, on each examination there were 50 questions requiring multiple-choice answers and 18 questions requiring constructed answers. Second, on each examination there were 26 verbatim-recall questions which retained the wording of material in the textbook, and 42 comprehension questions which paraphrased material in the textbook or required students to apply that material in a manner not covered in the textbook. Third, on each examination there were 34 old questions covering textbook material which had previously been covered by adjunct questions, and 34 new questions covering textbook material which had not previously been covered by adjunct questions. It should be noted that if material covered by an examination question had also been covered by an adjunct question, no attempt was made to use the format of the adjunct question in developing the examination question. For example, an adjunct question might have required verbatim recall of a principle, whereas its corresponding examination question might have required students to apply the principle.

Within each of the eight categories of questions resulting from this three-way classification, each type of question was represented in the same proportion as it was represented in the entire examination. For each subject, percent-correct scores on the midterm and final examinations were determined for each of these eight categories of questions. Appropriate combinations of these eight percentage scores were then averaged, with all relevant scores weighted equally, to yield the following scores that were used as dependent variables in the analyses of results from the midterm and final examinations:

(1) Multiple-Choice Questions, (2) Constructed-Answer Questions,
(3) Verbatim-recall Questions, (4) Comprehension Questions,
(5) Old Questions, and (6) New Questions.

Design

The one-quarter introductory course in college biology was divided into two sessions of approximately equal duration. The first session was followed by a midterm examination which included 68 questions covering textbook material from the first half of the course. The second session was followed by a final examination which included 68 questions covering textbook material from the second half of the course. During the first half of the course, half of the students were required to complete adjunct questions (experimental group), and the other half were not (control group). During the second half, experimental and control groups were reversed. This cross-over design was used to insure equal treatment for the two groups over the course.

Separate analyses were conducted for results on the midterm and final examinations. For each analysis, the experimental group was further divided into two subgroups. One subgroup included students who reported on the end-of-course questionnaire that they read and answered adjunct questions after reading relevant sections of text, as instructed. The other subgroup included students who reported that contrary to instructions, they read adjunct questions before reading relevant text sections, and answered the questions while reading the text.

Subjects

The course was open only to students not majoring in a biological science. Data were analyzed for all students who completed the end-of-course questionnaire and for whom all test data were available. Of these students, 66 were in discussion sections that were randomly assigned to the midterm experimental group, and 66 were in discussion sections that were randomly assigned to the midterm control group. There were no significant differences between the groups on sex, class standing, or general ability as measured by Scholastic Aptitude Test (SAT) verbal and mathematics scores.

Results

Midterm Examination

It was determined, from the questionnaire that was administered at the end of the course, that 46 subjects in the experimental group for the midterm examination followed instructions by reading and answering adjunct questions after reading relevant textbook sections (After Group). The remaining 20 subjects in the experimental group read adjunct questions before reading relevant textbook sections, thereby failing to follow instructions (Before Group).

Performances of these two groups were compared, along with that of the Control-Group, on each of the six dependent variables with one-way analyses of covariance. SAT verbal and mathematics scores, which were moderately correlated with our dependent variables, were used as covariates in order to increase the sensitivity of the analyses. No significant differences were found between groups, although both the After Group and the Before Group had higher scores than the Control Group on all dependent variables, as expected. There was no significant Group x SAT verbal interaction, nor was there any significant Group x SAT mathematics interaction.

Final Examination

More encouraging results were obtained on the final examination. It was determined from the questionnaire that 37 subjects in the experimental group read and answered adjunct questions _after_ reading relevant textbook sections as instructed (After Group). The remaining 29 subjects in the experimental group read adjunct questions _before_ reading the textbook (Before Group).

Analyses of covariance, similar to those described for the midterm examination, yield the results shown in Table 1. The means and standard deviations in Table 1 were computed after residualizing each subject's scores on SAT verbal and SAT mathematics. Significant differences between groups were obtained for all dependent variables except Multiple-Choice Questions and New Questions. There were no significant Group x SAT verbal or Group x SAT mathematics interactions.

Dunnett's *t*-tests were then computed for each of the four dependent variables on which overall *F*-tests were significant. These

Table 1

Mean Percent Correct Answers for Control and Experimental Groups on Six Dependent Variables

	Control Group	Experimental Groups			Dunnett's Tests	
		After Grp.	Before Grp.			
Variable	Mean (SD)	Mean (SD)	Mean (SD)	Overall *F*	Cont. vs After	Cont. vs Before
Multiple-Choice	57.8(11.1)	61.5(10.3)	59.8(9.2)	1.46	----	----
Constructed-Answer	52.1(13.4)	61.0(12.9)	55.0(13.3)	5.42**	3.36**	0.98
Verbatim-Recall	52.7(11.6)	59.2(12.3)	54.6)11.9)	3.58*	2.74*	0.72
Comprehension	57.2(11.5)	63.2(10.8)	60.2(10.3)	3.64*	2.72*	1.21
Old Question	56.2(11.3)	64.1(11.1)	59.5(11.2)	6.01**	3.53**	1.48
New Question	53.7(12.3)	58.4(12.1)	54.8(10.1)	1.87	----	----

*$p < .05$ (two-tailed test)

**$p < .01$ (two-tailed test)

tests showed that differences between the Control Group and the After Group were significant on constructed, verbatim, comprehension, and old questions, only. None of the differences between the Control Group and the Before Group was significant, although the differences were in the expected direction for all six dependent variables.

Discussion

The major problem to discuss and interpret is the conflict between the expected and largely significant results obtained on the final examination that did not obtain on the midterm examination. One interpretation is that students who were in the experimental group before the midterm did not take seriously our instructions that the adjunct questions would help them on the midterm. On the other hand, after taking the midterm, which was very difficult, the experimental group in the second half of the course realized that it was difficult to pass the course, and therefore took our instructions seriously and now used the adjunct questions as a study aid. Of course, our results do show on the final that, according to previous results and theory (Anderson & Biddle, 1975), students who read and answered the adjunct question after reading the relevant passages performed significantly higher than the control group on all of the criterion measures except the multiple choice and new questions. Interestingly enough though, even the results on the multiple choice and new questions were in the predicted direction. Also, even the experimental group that did not precisely follow the instructions, but fudged a little and read the adjunct questions before reading the relevant passage, did consistently but not significantly better than the control group. Apparently reading the questions before operates as an advanced organizer (Ausubel, 1960) to some extent. Thus, even in a "live" uncontrolled course-like-situation with large and conceptually difficult and integrated reading assignments, adjunct questions still have a beneficial effect--providing the students are convinced that the use of adjunct questions will be helpful with difficult expository material.

There is also another possible, but probably less plausible, explanation for the discrepant results between the midterm and final examinations. In the second half of the course there were two topics that are usually more difficult for non-biological science majors. They are genetics and bio-chemistry. Since the University of California generally has rather good students who may not need adjunct question study aids most of the time, it was only when two difficult topics were read that most students in the experimental group followed instructions and found the adjunct questions useful and therefore performed better on the final.

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Footnote

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A Study of the Effects of Cognitive Mapping on Reading Comprehension and Written Protocols

by

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Many college students are good readers who often have not learned the skills that will assist them in being successful, critical readers of college texts (Meyer, 1979; Brown, 1981; Tierney, 1982). The types of reading, analyzing, and synthesizing students are asked to do in college are both quantitatively and qualitatively different from what was asked of them in secondary schools. Although these students score high on standardized reading tests requiring them to read and interpret short passages, they have difficulty orchestrating information from the longer texts they are asked to read and write about in college.

A recent survey at UC Berkeley revealed that many students had just one technique for reading a chapter or section of a longer text; they read the chapter and underlined pertinent information, and if they did not understand everything, they read the chapter again and again so that at the end of their studying for a course many had underlined as if every sentence or idea in a chapter had equal importance (Ruddell & Boyle, 1981); as a result of their confusion about the nature of college reading, these students often wrote essays about their reading which lacked focus and cohesion.

Recently, researchers have addressed the ways readers interact with text (Rumelhart, 1979; Kintsch, 1980). Implicit to this work is a reading comprehension model which requires readers to relate and organize information in texts according to their prior knowledge about a subject. These researchers suggest the necessity for readers to organize, integrate, and chunk information into experimental and associational patterns in order to comprehend information in texts.

Various techniques have been developed to assist students in organizing and integrating information in texts and in reporting this information in writing. One of the most promising of these techniques is cognitive mapping (Hanf, 1971; Buckley-Hanf & Boyle, 1981). A map is a graphic representation of a text which reduces memory load and facilitates integration and retention of information. Mapping asks readers to develop a cognitive scheme which is a reconstruction of the words on the paper. A map is at once a scaffolding used by readers to graphicallly arrange ideas and becomes a blueprint for compositions. It assists short-term memory because it chunks ideas; and it causes readers and writers to look for significant ideas and relationships rather than to see each sentence or idea as equally important. Because mapping assists readers and writers in patterning and chunking information in texts, it assists them in remembering and comprehending texts, and provides a plan for reporting what has been learned.

Hypotheses

The purpose of this study was to discover if and how mapping assists undergraduate college readers in gathering information from long prose passages and in organizing this information for writing. This study parallels the common ecological context of university courses by asking students to read long passages and asking them to write essays based upon these passages. Five hypotheses guide the study:

1. Students in treatment groups 1A and 1B[1] who develop cognitive maps based upon expository passages they have read will have significantly higher holistic scores on written protocols for each of three text patterns than students in treatment group 2 who do not map passages.

2. Students in treatment groups 1A and 1B who map will write essays with significantly more cohesive ties than students in treatment group 2 who do not create cognitive maps.

3. Students in treatment groups 1A and 1B who map will write longer essays than students in treatment group 2 who do not map.

4. Students in treatment groups 1A and 1B who develop cognitive maps will identify significantly more main ideas and supporting details in written protocols than students in treatment group 2 who do not map passages.

5. Different organizational patterns in the expository passages will significantly affect students' holistic writing scores regardless of treatment. The following order of difficulty is predicted for both the pre and posttests: Informational<Thesis-proof<Problem-solution.

Rationale

Mapping is a prewriting technique which assists writers in generating, relating and shaping ideas. Students who develop maps for their essays should score higher on holistic evaluations of written protocols. The map gives writers a scaffolding for reconstructing and organizing ideas from text, and, because it assists memory, students can work with idea integration rather than on retrieving information. Thus, maps reduce cognitive demand on memory allowing students to concentrate on fluency and cohesion in their writing.

In addition to assisting students' writing, mapping should assist students in identifying main ideas and supporting details in articles. Cognitive mapping requires students to select basic ideas in a text, show their relationships, and become actively involved in reconstructing meaning from a text. As a result, it should assist readers in identifying text structure, main ideas, and supporting details.

Several recent studies have looked at student knowledge of text structure and comprehension of text (Bartlett, 1978; Brown, Campione, & Day, 1981). Based upon these studies, it would be expected that the three text structures in the Organizational Patterns Test, i.e., Informational, Thesis-proof, Problem-solution, administered to students in this study, will have an effect on student comprehension and composition. It is further expected that the informational pattern which presents propositions in a straightforward manner will be the easiest for students to understand and write about. In order to write an essay based upon the informational pattern, students need only to note the basic pieces of information and report them back linearly in a written protocol. In the thesis-proof and problem-solution patterns, however, students must not only gather information but they must also integrate, synthesize and reorganize the information to reconstruct the author's intended meaning. Because these latter patterns require a conscious and systematic approach to reading and writing, students should have greater difficulty reading and reporting their learning based upon these patterns.

Methodology

Sample

The study was conducted at the University of California, Berkeley in the spring quarter of 1982. The 51 undergraduate students involved in the study volunteered to participate in a 'Learning from Text' course offered by the Graduate School of Education and the Student Learning Center. All 51 students volunteered to take different sections of the course based upon the hour that was convenient for them. The 17 Ss in treatment group 1A took the course as an adjunct to Sociology 1; the 17 Ss in treatment group 1B came from other courses across campus, but were not in Sociology 1; the 17 Ss in treatment group 2 took the 'Learning from Text' course as an adjunct to Sociology 1.

While random assignment was not used in assigning Ss to treatment groups, the nature of the self-selection, based on Ss schedules, provided for randomization. Support for this assumption can be found in examining the Ss STEP vocabulary and comprehension test scores. Mean raw scores on the STEP for the three groups were: Treatment group 1A: 36; Treatment group 1B: 35; Treatment group 2: 36. These STEP raw scores are equivalent to a freshmen sample of one hundred and sixty-one students who attended UC Berkeley in the fall of 1982 and achieved a mean raw score of 35 (Ruddell & Boyle, 1982).

Treatment

All 51 Ss participating in the three sections of the 'Learning from Text' course were taught by the same instructor. The experimental intervention for treatment groups 1A and 1B consisted of three hours of instruction on mapping combined with the rest of the course which developed reading strategies including SQ3R and writing strategies emphasizing cohesion and revision. Treatment group 2, the control group, received the same intervention as treatment groups 1A and 1B except no mapping instruction was provided.

Although all three treatment groups in this study were taught by the same instructor, every effort was made to provide equal treatment for all three groups. The instructor kept a daily log to insure that the same skills were taught to each group with the exception of the mapping treatment.

The mapping process taught to Ss in this experiment was first developed for reading by Hanf (1971) and later developed for writing by Hanf-Buckley and Boyle (1981). The mapping process was introduced to Ss in the following way: first, students were told to generate as many words or phrases as possible on the topic, "The problems of being an undergraduate at UC Berkeley;" next, students were asked to organize their words into categories; finally, they were asked to place their main idea in the center of a model map similar to Figure 1 and to place secondary and tertiary ideas in the appropriate extensions.

After an introduction to mapping, students typically go on to create more individualistic maps. Undergraduate students were found to develop sophisticated maps using interlocking triangles, concentric circles, and ladders to depict relationships which were used to help them structure their writing and shape it for special purposes and audiences. Mapping was used to provide a working outline---each category used to develop explanation, definition, classification, example, narration, comparison (Boyle, 1983). After a brief twenty minute introduction to mapping, students were told to map chapters they were reading using the first map as a prototype. The map in Figure 2 is a typical first effort by a freshman student based on section II of Jaggar & Rothenburg-Struhl's Feminist Frameworks: Alternative Accounts of the Relations between Women and Men (1978).

Instrument

Six expository passages operationally define the Organizational Patterns Test (OPT). All Ss were required to read the long prose passages presented in the OPT and to write about the main ideas and supporting details in these passages. The Fry Readability Scale was used to determine that the passages have similar reading levels; all passages were at the 11th or 12th grade level. The length of the passages were between 1300 and 1400 words.

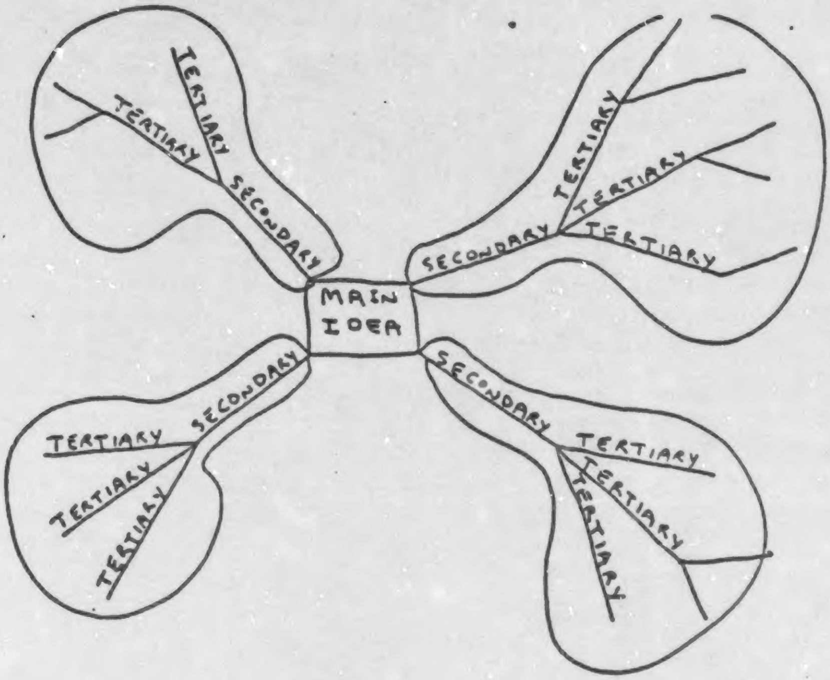

Fig. 1. Map used as a model in introducing cognitive mapping to students.

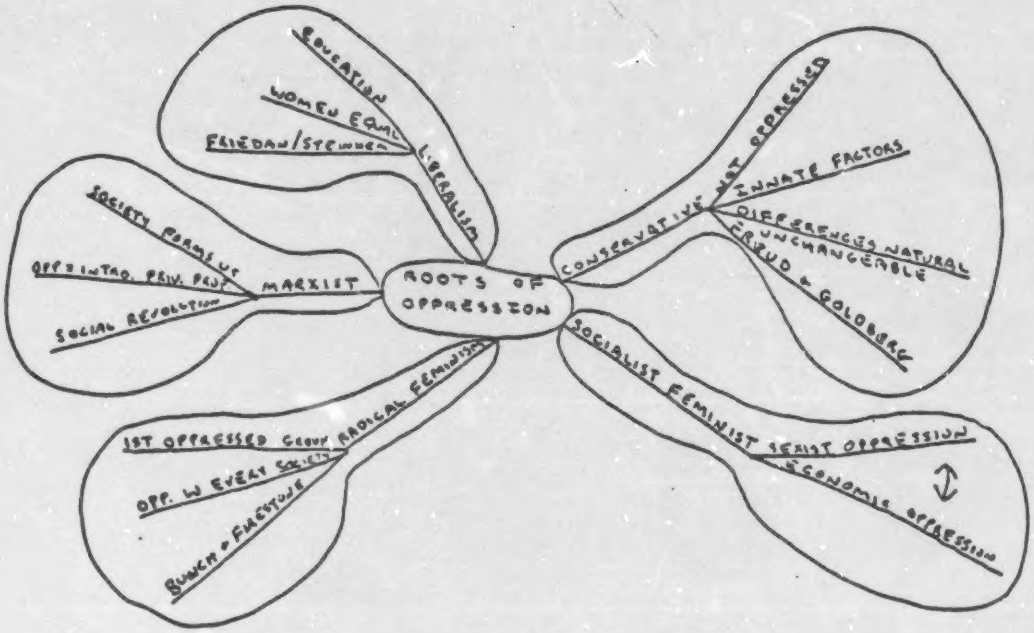

Fig. 2. Typical first map by freshmen student completed after twenty minute introduction.

The OPT contains two forms, each containing three different organiational patterns (1) informational, (2) thesis-proof, and, (3) problem-solution (Sach & Yourman, 1973). The patterns are defined in the following ways:

1. Informational pattern: The informational pattern begins with a thesis sentence or topic sentence which is followed by supporting details presented in a list-like manner. The article in form one was about the common causes of headaches and the article in form two was about M.B.A.'s on college campuses.

2. The thesis-proof pattern: The thesis-proof pattern presents information about a main idea or thesis, gives readers background information, proves a point of view, and suggests the implications of the essay. The article in form one was concerned with the prison system in the United States and the article in form two was about traffic courts.

3. Problem-solution pattern: The problem-solution pattern presents a problem, suggests the effects and causes of the problem, and proposes a resolution of the situation. The article in form one was about DNA research and the article in form two was about antihistamines.

Procedure for Administering the OPT

Ss were tested in pre and post conditions to assess their ability to analyze and synthesize the passages in the OPT and to write about what they had read. Two class periods before the test, Ss were taught techniques which would assist them in writing from given information in textbooks. They also wrote on articles similar to the OPT passages.

Two forms of the OPT were given to the Ss. Half of the students in each group were administered form one as a pretest and form two as a posttest. The administration procedure was reversed for the remaining students.

Upon receiving the OPT, students were asked to write essays discussing the main ideas in each article and supporting details for these ideas. In the pretest, students in all treatment groups were given ten minutes to prepare to write their essays. In the posttest, students in treatment groups 1A and 1B were given ten minues to map the OPT articles before writing essays while treatment group 2 had ten minutes to prepare for the essays using an organizational preparation of their choice. All groups had the original articles for reference when they wrote their essays and had twenty minutes to write their essays.

Data Analysis

The first hypothesis stated that Ss in treatments 1A and 1B who developed maps of the reading passages would have significantly higher holistic scores on written protocols than Ss in treatment 2 who did not map articles. Holistic scores, derived from pre and posttest essays were used to address this hypothesis. The procedure for holistic scoring was first developed by Educational Testing Service twenty-five years ago. The procedure first separates the OPT essays into form one and form two and the type of organizational patterns in the forms. Next, a few papers are read quickly by research assistants and rated on a scale of one through six, with a score of one representing the lowest score and a score of six representing the highest score. These papers were used as anchors or model papers for reading the remaining papers, following the ETS procedure. The papers, finally, were read and scored by twenty-five teachers who were attending the UC Berkeley Summer Teacher's Program of the Bay Area Writing Project; pre and posttest essays were read together. The papers were read by two readers and given a score of one through six. If the two readers were two or more rating points apart, a third reader scored the essay and this was used to establish the final rating. An analysis of variance was used to determine whether treatment groups made significant gains from pre to posttest holistic scores.

The second hypothesis stated that Ss in treatment groups 1A and 1B who developed maps of the OPT passages would write essays with more cohesive ties than Ss in treatment 2 who did not map the passages. A trait analysis was performed on each student essay to determine and evaluate the kinds of writing students provided for the OPT. Cohesion was evaluated according to the number of various conjunctions students used in the essays. Four kinds of conjunctive links were counted (Halliday & Hasan, 1971; Kintsch & van Dijk, 1978): (1) causal, e.g., because, due to, since; (2) additive, e.g., also, in addition, first, second, third; (3) contrastive, e.g., however, on the other hand; (4) conclusive, e.g., in summary, thus, therefore. An analysis of variance was used to test for significance.

The third hypothesis predicted that Ss in treatments 1A and 1B who mapped in preparation for essays would write longer essays than Ss in treatment 2 who did not map. The number of words in each posttest essay was counted to obtain a mean score for Ss in treatment groups 1A and 1B and for Ss in treatment group 2. An analysis of variance was used to determine significance.

The fourth hypothesis stated that Ss in treatment groups 1A and 1B who developed maps of OPT passages would identify main ideas and supporting details more often than treatment 2 Ss who did not develop maps. The main ideas and supporting details in the OPT passages were used as the criteria to evaluate the main ideas and supporting details presented in students' essays. An analysis of variance was used to determine significance.

The fifth hypothesis stated that different organizational patterns would affect Ss' abilities in all treatment groups to read and write about what they were reading. It was predicted that the order of difficulty would be the folowing: Informational<Thesis-Proof<Problem-Solution. Both holistic scores of student essays and the trait analysis were used to test for significance.

Findings and Discussion

The first hypothesis predicted that Ss in treatment groups 1A and 1B who developed maps for their essays would score significantly higher on holistic scores on each of the three text patterns than Ss in group 2 who did not create maps for their essays. Figure 3

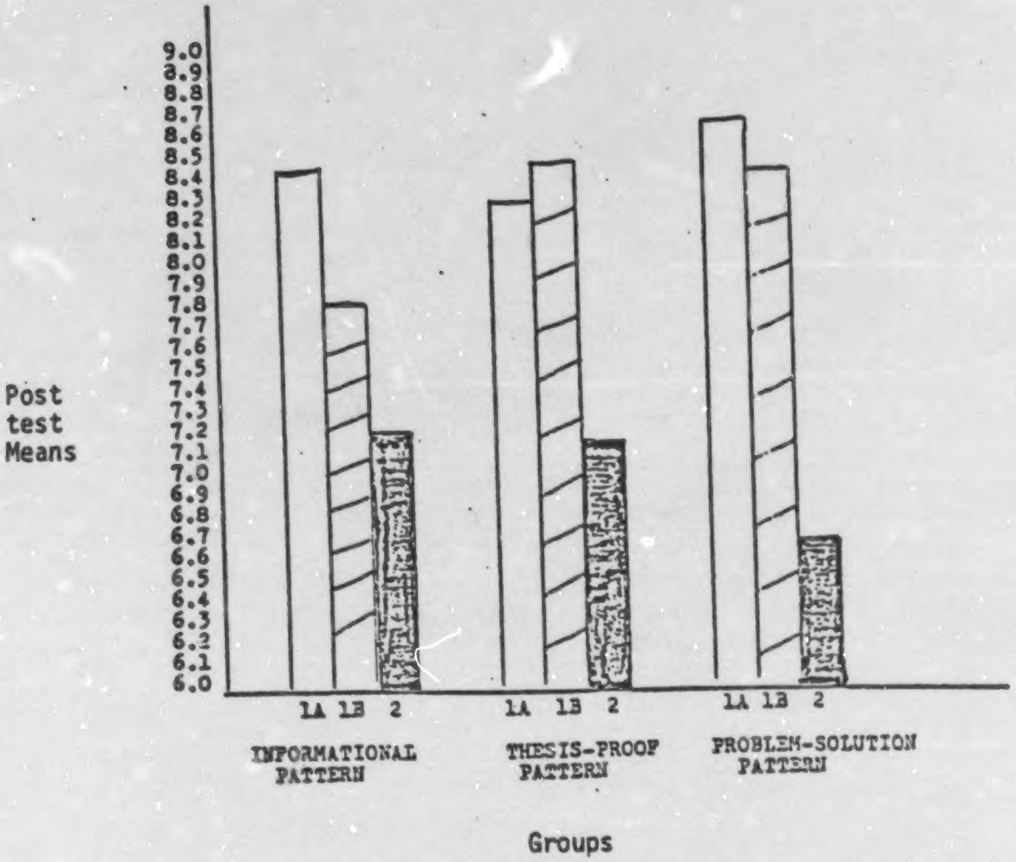

Fig. 3. Post test means for each treatment group on the Organizational Patterns Test, based on holistic scores.

illustrates the mean scores for each group on each of the three patterns. Treatment groups 1A and 1B, the mapping groups, scored higher on all three posttest essays than group 2, the nonmapping group. Moreover, when pre and posttest scores are compared, the analysis of variance indicates that the difference in gain scores on the thesis-proof and problem-solution patterns is significant, as shown in Table 1.

In addition to scoring higher on all three organizational patterns, Ss in treatment groups 1A and 1B show a greater rate of growth for each pattern than Ss in group 2, as depicted in Figure 4.

The second hypothesis stated that students in treatment groups 1A and 1B who mapped for their essays would write essays with more cohesive ties than students in group 2 who did not map. An analysis of cohesive ties (Kintsch & van Dijk, 1978) was used to compare and contrast the essays of mapping and nonmapping students. The following types of cohesive ties were identified in the essays: (1) causal, (2) additive, (3) contrastive, (4) conclusive. Figure 5 illustrates the total number of conjunctions or cohesive ties for each treatment group on all essays. Overall, the mapping Ss in treatment groups 1A and 1B used an average of four conjunctions for every one hundred words in the essays. in contrast, nonmapping Ss averaged two conjunctions for every hundred words. When essays were examined to discover if students were more likely to use certain types of conjunctions in response to specific organizational patterns, the results were negative. Students in all treatment groups used the same types of conjunctions in response to each of the organizational patterns. The

Table 1

Analysis of variance for each of the three essays based on the three patterns in the Organizational Patterns Test. Analysis based on a comparison of pre and post test holistic gain scores for each of the treatment groups.

INFORMATIONAL PATTERN

	Sum of Squares	DF	Mean Square	F-Value
Between Groups	$SS_b = 5.30$	2	$MS_b = 2.65$	
Within Groups	$SS_w = 73.37$	46	$MS_w = 1.59$	1.66
Total	$SS_t = 78.67$	48		

THESIS-PROOF PATTERN

	Sum of Squares	DF	Mean Square	F-Value
Between Groups	$SS_b = 38.57$	2	$MS_b = 19.28$	
Within Groups	$SS_w = 53.37$	46	$MS_w = 1.16$	16.62*
Total	$SS_t = 91.94$	48		

PROBLEM-SOLUTION PATTERN

	Sum of Squares	DF	Mean Square	F-Value
Between Groups	$SS_b = 42.8$	2	$MS_b = 21.4$	
Within Groups	$SS_w = 62.45$	46	$MS_w = 1.35$	15.85*
Total	$SS_t = 105.25$	48		

*Significant at .001 level.

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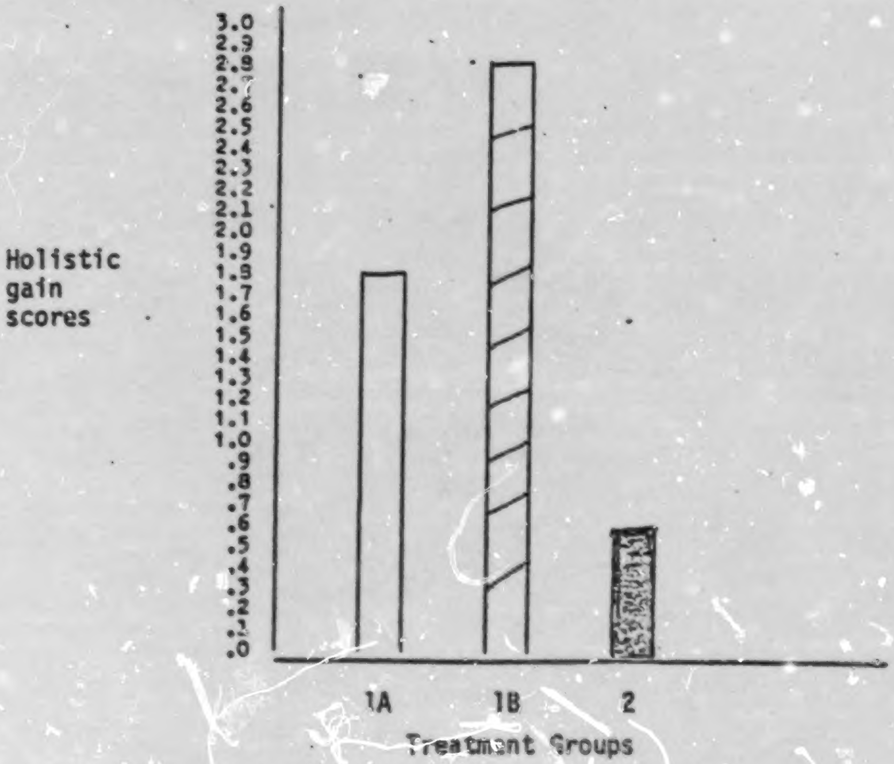

Fig. 4. Total holistic gain scores for students in each treatment group. Scores based on the Organizational Patterns Test.

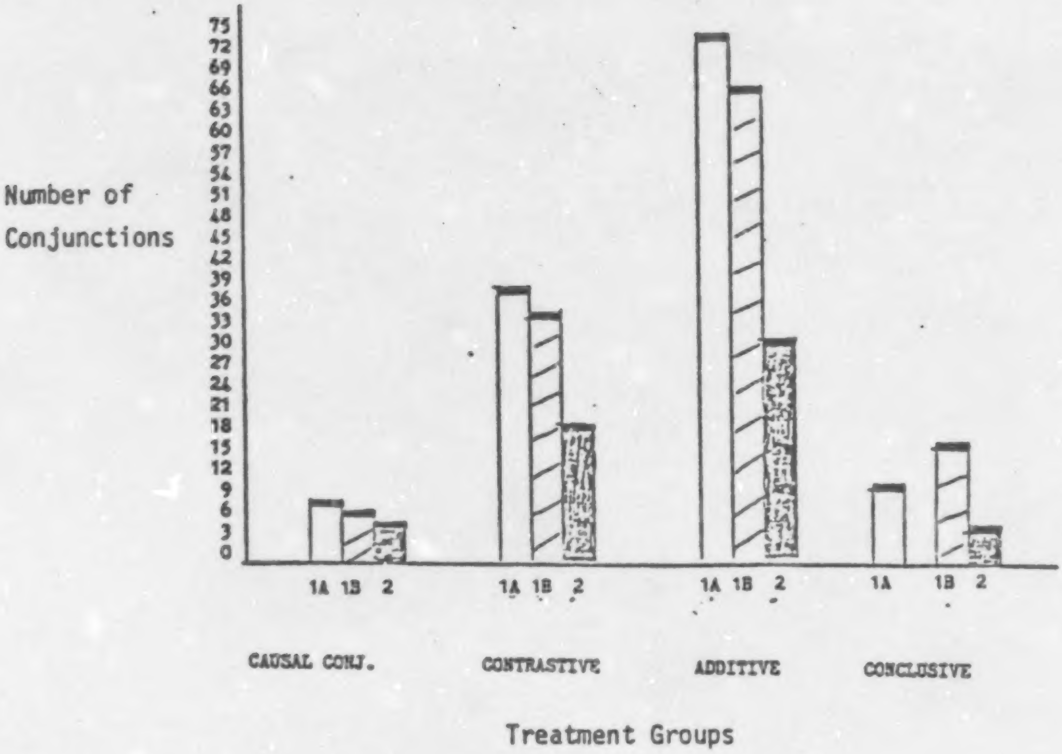

Fig. 5. Total number of conjunctions in each category for each of the treatment groups. Scores based on a trait analysis performed on the essays written for the Organizational Patterns Test.

analysis of variance on gain scores for cohesive ties, Table 2, indicates that the difference in use of cohesive ties was statistically significant when comparing gain scores between the pre and posttests.

The third hypothesis stated that Ss who developed maps for their essays would write longer essays than Ss who did not develop maps. Ss in groups 1A and 1B wrote longer essays than Ss in group 2 who did not map for their essays. Figure 6 shows that Ss in treatment group 1A wrote essays averaging 197 words in length, group 1B essays averaged 201 words and group 2 essays averaged 185 words. Thus, Ss who mapped wrote essays which were 7% longer than nonmapping Ss. And, as previously discussed, mapping Ss also wrote essays with significantly more cohesion than did nonmapping Ss.

The fourth hypothesis predicted that Ss in groups 1A and 1B who developed maps based on their reading would identify main ideas and supporting details significantly more often than Ss in group 2. The essays of Ss in treatment groups 1A and 1B were compared with group 2 Ss who did not develop cognitive maps. Based upon the data in the trait analysis, no difference was found in the students' abilities to recognize the main ideas in articles. Ss in the mapping groups, however, did use more supporting details than the nonmapping Ss. As shown in Figure 5, mapping Ss used more conjunctions than nonmapping Ss. These conjunctions not only represent cohesive points in the essays, but also represent shifts in propositions relating to the articles the students read. Thus, Ss in the mapping groups related more propositions or supporting details than the nonmapping students.

Table 2

Analysis of variance on gain scores
for cohesive ties across all treatment groups and
for the three sections of the Organizational Patterns Test

COHESIVE TIES

	Sum of Squares	DF	Mean Square	F-Value
Between Groups	$SS_b = 23$	2	$MS_b = 11.5$	
Within Groups	$SS_w = 48$	46	$MS_w = 1.04$	11.05
Total	$SS_t = 71$	48		

*Significant at .001 level

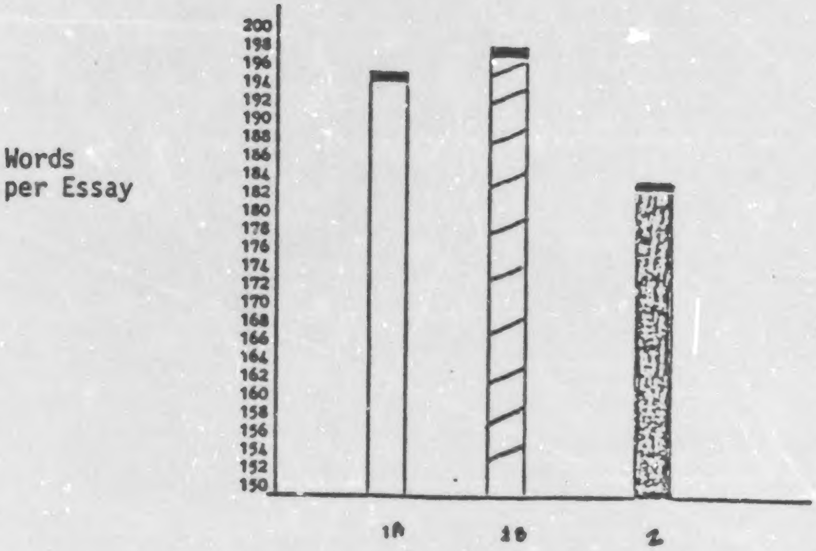

Fig. 6. Mean number of words for each of the three essays on the Organizational Patterns Test for each of the three treatment groups.

The maps apparently assisted students in graphically listing details and in writing about and remembering the details in the articles on the OPT.

The fifth hypothesis stated that different organizational prose patterns would affect all Ss' abilities to analyze and synthesize information and to report what they had learned in written protocols. The following order of difficulty was predicted:

informational<thesis-proof<problem-solution

The pretest results of the OPT written protocols appear to support this order of difficulty; the OPT results after intervention, however, present quite different results.

Informational Pattern. Ss in each treatment group received their highest holistic score on the pretest informational pattern, but the overall posttest scores on the informational pattern were the lowest. It would appear that students received their highest score on the pretest on the informational pattern because it was the easiest for them to read and because the information was presented in a serial/list-like fashion, i.e., topic sentence followed by several supporting details. It was also easier for them to organize a written protocol. The information patterns consisted of basic ideas, i.e., causes of headaches, followed by information presented in serial fashion, i.e., first cause, second cause, third cause. This informational structure elicited a similar list-like structure on written protocols. Students in all three treatment groups typically gave the main ideas of these articles and then gave the various details in identical order as presented in the original articles. The informational structure asked for no special reordering or reconstructing of information; as a result, students found it easiest to write about in the pretest. The lack of growth in the posttest may be due to a ceiling affect resulting from the simple structure of the informational article which elicited essays with less sophisticated structure.

Thesis-proof and Problem-solution Patterns. The thesis-proof and problem-solution patterns elicited different patterns of responses from Ss than did the informational pattern. Ss could not as easily develop essays from these patterns in a serial-like manner. Ss were required to reconstruct information in these two patterns by first analyzing and then synthesizing the information presented in the articles. Rather than just writing about the first, second, and third aspect presented in an informational aticle, Ss had to consciously orchestrate the information in the thesis-proof and problem-solution patterns because the information was not presented in a list-like manner, e.g., thesis-proof: Thesis-background-proof-implication; and, problem-solution: problem-effects-cause-solution.

Ss in treatment groups 1A and 1B made greater holistic gains on the thesis-proof and problem-solution patterns than did Ss in group 2. The latter Ss who did not map articles progressed relatively the same on all three patterns. Mapping the articles helped students reconstruct the information in the articles and helped them present the information more effectively. The mapping Ss in treatments 1A and

1B received an average holistic score on these two patterns of 8.3 points while nonmapping students averaged 7.2.

Mapping students gained an average of two points in holistic scores while nonmapping students advanced only .6 point. It is interesting to note that nonmapping Ss showed the same rate of growth from pre to posttests on all three patterns whereas mapping Ss showed a greater rate of growth on the more difficult patterns. This information suggests that mapping is particularly helpful when students are reading difficult material.

Summary and Conclusions

The purpose of this study was to identify the effects of cognitive mapping on written protocols derived from three different text patterns. The following conclusions are based on the findings of the study.

First, Ss who mapped articles they read and used these maps to develop written protocols scored significantly higher on holistic scores for two of the 3 patterns than students who did not develop cognitive maps for their writing. In addition, Ss who mapped showed significant growth when pre and posttest holistic scores were compared.

Second, Ss who developed maps for written protocols wrote essays containing more cohesive ties than did Ss who did not map for their essays. It is hypothesized that the maps assisted Ss in organizing and synthesizing the ideas presented in the OPT articles and enabled them to concentrate on the interrelationships between and among ideas in their essays.

Third, Ss who mapped the OPT articles wrote longer essays with more supporting details from the OPT articles than Ss who did not develop maps. It is hypothesized that the maps reduced memory demand, allowing them to generate and integrate more ideas and details from the articles.

Fourth, students in all treatment groups identified main ideas in articles with equal success resulting in no significant differences. However, mapping did assist students in generating more details in their essays.

Fifth, organizational patterns had an effect on written protocols for all Ss, but this effect appears to be neutralized when students use maps to organize essays based upon articles they have read. On the pretest OPT holistic scores, students scored highest on the informational pattern as predicted and lowest on the problem-solution pattern. After mapping, however, mapping treatment Ss in 1A and 1B scored higher on the problem-solution than on the informational pattern. Treatment group 2 scored highest on the informational and lowest on the problem-solution patterns in both the pre and posttests. Thus, it was concluded that mapping assisted students in the more difficult tasks of orchestrating the information and ideas in the thesis-proof and problems-solution patterns.

Footnote

1. The only difference between group 1A and 1B was that students in group 1B came from different courses across the campus rather than from Sociology 1.

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Direct Instruction in Metacognitive Strategies: Cumulative Instruction in Summarization and Graphic Organizer Construction vs. Graphic Organizer Alone vs. an Outlining Strategy in 10th Grade World History[1]

by

Thomas W. Bean, CSU Fullerton; Harry Singer, UC Riverside;
Jack Sorter, Garden Grove High School; and Charles Frazee, CSU Fullerton

High school students possess a surprisingly limited repertoire of independent study strategies. In the middle grades they acquire some knowledge of formal outlining. This single strategy endures through high school and into college. Indeed, outlining and re-reading were the only two strategies mentioned when we queried 58 average and above average 10th graders about procedures they used to study world history (Bean, Singer, Sorter, & Frazee, in press). Students in public schools are not permitted to underline their borrowed texts but they are taught to outline in their English classes. Therefore, it came as no surpise that outlining was the preferred strategy.

Alternatives to outlining that are less rigid in structure and more vivid in depicting interrelationships among concepts have been available to teachers and students for quite some time. For example, Barron's (1969) graphic organizer which portrays text concepts in a visual hierarchy that is considerably less linear and formal than an outline has been recommended as a study aid in social studies (Lunstrum & Taylor, 1978; Thelen, 1982; Vaughan, 1982).

We were interested in comparing the effect of outlining instruction versus graphic organizer instruction on 10th grade students' comprehension of world history. In addition, we wanted to compare students' attitude toward the outlining and graphic organizer strategies, especially in terms of any desire they might express to use the strategy learned in other classes. Attitude strongly influences academic success and contributes to a comprehensive prediction of students' grade point average that enhances predictions based on achievement data alone (Bean & Singer, 1983; Carter, 1957).

Finally, the effectiveness of any study strategy is likely to covary with the difficulty of the text. Thus, we compared students instructed in outlining versus graphic organizer construction on a summarization task involving difficult world history text.

Before describing the design of our study, we want to briefly review previous outlining and graphic organizer research. Despite the historical prominence of outlining and its dominance as a study strategy known and used by students, relatively few studies have explored its efficacy.

Review of Research

In a comprehensive review of investigations comparing student-generated study aids, Anderson (1980) concluded that without explicit instruction in a procedure such as outlining, students do as well simply rereading text assignments. However, when students receive direct instruction in outlining or any similar study procedure, their comprehension and retention of information usually outpaces that of untrained peers. For example, in one of the few high school studies of outlining, Barton (1930) trained 96 high school students to skim paragraphs for main ideas and supporting details. He also taught them to delete trivial information. Barton's procedure parallels Kintsch and van Dijk's macrorules used in recent studies to teach summarization

(Bean et al., in press; Day, 1980; McNeil & Donant, 1982). Students taught outlining achieved significantly higher test scores on social studies passages than a matched control group receiving similar instruction but without the outlining component.

Outlining has received little research attention since Barton's study despite its wide use by students in secondary classrooms. In contrast, graphic organizers have piqued the interest of researchers. Much of this research was reviewed and synthesized in a meta-analysis conducted by Moore and Readence (1980). Of the 16 studies considered in their analyses, only four involved a treatment condition where students constructed their own graphic organizers after reading. The average effect size for this treatment was .38 versus a very small effect of .15 for those studies where the graphic organizer was developed by the teacher and used as a pre-reading guide. Moore and Readence concluded that student-constructed graphic organizers were more likely to facilitate comprehension. Moreover, they suggested that high verbal ability students were most adept at learning and applying this independent study strategy.

The design of our study was predicated on the belief that student constructed outlines and graphic organizers would be most facilitative. However, we predicted that graphic organizers depicting interrelationships among text ideas would contribute more to students' understanding and retention than outlines that list concepts in a linear fashion.

Design

Materials and Procedures

Two classes of students comprised the experimental treatment groups. They were instructed in a three-step procedure for creating a graphic organizer of lesson concepts presented in their world history text, Echoes of Time: A World History (Ostrowski & Kemper, 1977). The text had an average readability rating of 10th grade (Raygor, 1977). It presented ideas in a coherent superordinate to subordinate fashion which made it quite readable. Therefore, the first step in our three-step procedure for constructing a graphic organizer involved selection of a topic sentence that tied together subordinate ideas in a text passage. Step two asked students to develop a graphic organizer displaying interrelationships among ideas in the text. Finally, step three asked students to derive a generalization or concluding statement based on information depicted in their graphic organizers. These steps are based on Kintsch and van Dijk's (1978) macrorules for abstracting, integrating, and retaining concepts in long term memory. Bean et al. (1983) used similar steps in a previous study aimed at training 10th graders to summarize and generate questions about world history. Students in the first experimental group were the recipients of this earlier training while the second treatment group did not have previous experience with any learning from text strategy. Thus, the students in the first experimental group had prior experience in summarization rules plus instruction in constructing graphic organizers, the second experimental group had instruction only in use of graphic organizers.

The following example displays the graphic organizer instruction received by the two experimental groups. The first author walked students through a partially completed graphic organizer on a simple informational passage from their text. The passage was one that students summarized in the previous study (Bean, et al., 1983). Thus, they could focus their attention on the process of graphic organizer construction rather than the content of the passage.

The Age of Discovery

What motivated the European countries to explore and expand their horizons?

One reason was the search for adventure. Europeans eagerly listened to and read tales about the journeys of travelers to the Orient, especially Marco Polo's overland trip to China in the thirteenth century. This stirred imaginations and desires for similar riches and glory.

A second reason was religion. Christianity in its first twelve centuries had already spread throughout southern, central, and northern Europe. Then during the period of the crusades, it had attempted to convert the Moslems in the Near East. Now, by the fifteenth century, Christian missionaries were looking for new arenas of conversion and were beginning to turn their energies toward Africa and Asia.

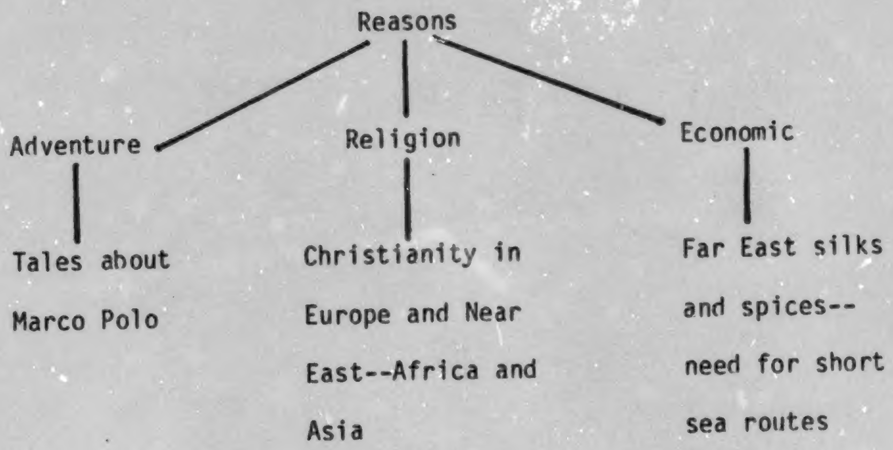
A third and, probably, the strongest reason for European exploration was economic. There was a great demand in Europe for the silks and spices of the Far East, but the overland routes to the Orient were controlled by the Moslems. Whichever country found the shortest sea route would reap tremendous wealth from the resulting trade. Then too, there was the desire to find gold and silver and precious stones--all of which were in short supply in Europe.

Using the three step procedure described earlier, students contributed ideas for the construction of a graphic organizer illustrated below.

Construction of a Graphic Organizer

1. Selection: Write the topic sentence.
"What reasons motivated European countries to explore and expand their horizons?"

2. Diagram

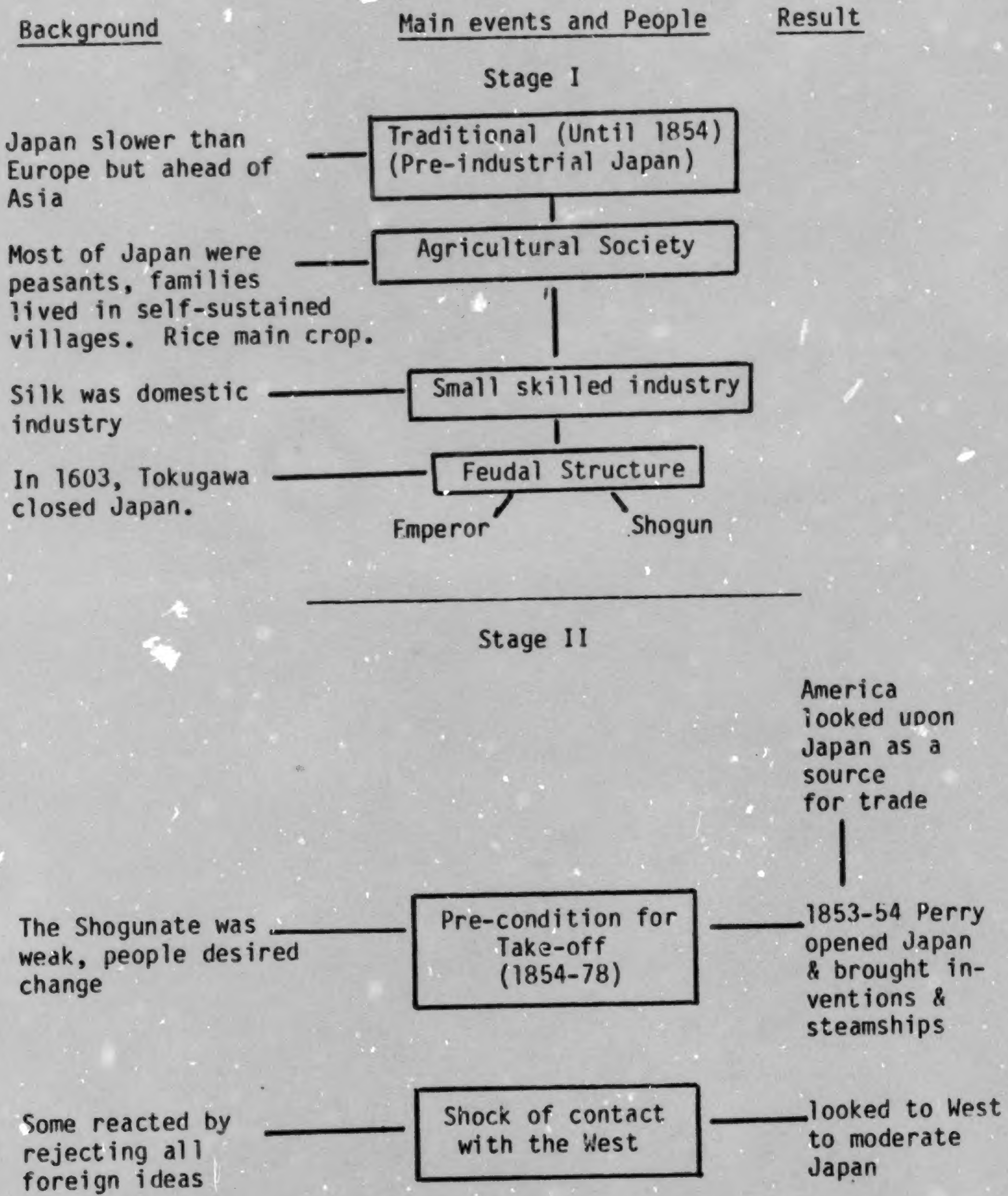

Reasons
Adventure
Religion
Economic
Tales about Marco Polo
Christianity in Europe and Near East--Africa and Asia
Far East silks and spices--need for short sea routes

3. Generalization: Three major reasons motivated Europe to expand its horizons but the most important was economic trade.

Prior to this first instructional session, both the first author and the teacher read and discussed recent articles highlighting the use of graphic organizers (e.g. Vaughan, 1982). In addition, the teacher, Jack Sorter, experimented with the development of his own graphic organizers on various sections of the text. He discovered that a good procedure for generating a world history graphic organizer involved placing background information on the left, main events and people in the middle, and key results on the right side of the page. Students were encouraged to use this format for their graphic organizers.

Following the initial demonstration of graphic organizers, students engaged in guided practice developing a graphic organizer in small groups on their first reading assignment, "the roots of English government." These were evaluated by the teacher using a check plus, check,or check minus giving students feedback on their efforts to use the strategy. Thereafter students individually generated graphic organizers for each lesson and continued to receive teacher feedback. The following example is an excerpt from a student's graphic organizer on the Industrial Revolution in Japan. It represents a well-developed graphic organizer completed after about 12 weeks of instruction in the strategy.

Graphic Organizer on the Industrial Revolution in Japan



Background	Main events and People	Result
	Stage I	
Japan slower than Europe but ahead of Asia	Traditional (Until 1854) (Pre-industrial Japan)	
Most of Japan were peasants, families lived in self-sustained villages. Rice main crop.	Agricultural Society	
Silk was domestic industry	Small skilled industry	
In 1603, Tokugawa closed Japan.	Feudal Structure Emperor Shogun	
	Stage II	
		America looked upon Japan as a source for trade
The Shogunate was weak, people desired change	Pre-condition for Take-off (1854-78)	1853-54 Perry opened Japan & brought inventions & steamships
Some reacted by rejecting all foreign ideas	Shock of contact with the West	looked to West to moderate Japan

A third group of students generated traditional outlines of lesson concepts. They used a three-step procedure modelled by the first author in the same sequence as the graphic organizer group. They simply generated an outline for step two rather than a graphic organizer. The following excerpt illustrates a typical student outline.

Growth of Industry in Japan

I. Pre-Industrial Japan
    A. Traditional Society (522-1854)
        1. Agricultural Society
            a. most Japanese were rice farmers
            b. most Japanese lived in self-sufficient villages
        2. Small scale industry
            a. silk production
            b. similar to domestic system in England
        3. Feudal Society
            a. figurehead emperor
            b. shogun had real power
            c. samurai were shogun's men
    B. Tokugawa Shogunate (1603-1868)

There were few discernible differences in individual student outlines or graphic organizers. They all stayed close to the structure of the text in selecting and depicting superordinate and subordinate information. Outlines tended to include more lower level detail than graphic organizers.

Comparison of the three groups involved the following dependent measures:

1. Six 15-item text explicit multiple-choice quizzes spanning four chapters of text or 19 lessons (i.e., over 156 pages of text reading with a range of five to 20 pages of text per lesson).
2. A Likert scale measuring students' attitude and self-reported future application of graphic organizers or outlining.
3. A delayed summarization task in more difficult text (i.e. Wallbank, Taylor, Carson & Mancall, 1969).

Subjects

Seventy-two 10th grade students enrolled in three sections of honors world history at Graden Grove High School participated in the study. They comprised a matched group of students based on a five item multiple-choice quiz appraising their prior knowledge of "the roots of English government," the first text reading assignment of the spring term, $\underline{F}(2,69)=1.61$. The first graphic organizer group (n=25) achieved a mean of 2.56 with a standard deviation of .82. The second graphic organizer group (n=25) received a mean score of 2.68 with a standard deviation of .83. The outlining group (n=26) achieved the highest mean score of 3.0 with a standard deviation of 1.0. All three classes consisted of average and above average students. Thus, to the extent that prior knowledge is related to comprehension, the differences in treatment groups were biased against our hypothesis.

Results

Six 15-item multiple-choice quizzes comprised the first dependent measure. The sixth quiz was administered after the strategy had been phased-out to assess how many students would independently use the study strategy they were taught. Thus, we tested for maintenance of the strategies taught. Quiz items emphasized both macrolevel and microlevel concepts with more than half the questions focusing on superordinate ideas. Table 1 displays the quiz results for the six quizzes.

Table 1

Mean Scores on Six Fifteen-item Quizzes

Quiz	Content	Group	N	Mean	S.D.
1.	English Gov't	GP01	28	11.67	1.49
	F(2,75)=.89	GP02	26	12.15	2.03
		Out	24	11.45	2.12
2.	Parliament	GP01	24	11.87	2.27
	F(2,71)=2.98	GP02	24	10.83	3.23
		Out	26	12.61	2.13
3.	Cabinet-Modern Gov't	GP01	22	12.13	2.18
	F(2,62)=.98	GP02	23	11.21	2.25
		Out	20	11.70	2.13
4.	Industrial Revolution	GP01	28	13.75	1.45
	F(2,77)=.72	GP02	24	13.25	1.89
		Out	24	13.39	1.31
5.	Japan	GP01	27	12.81	1.75
	F(2,73)=.29	GP02	22	12.86	2.00
		Out	27	12.48	2.06
6.	Russia	GP01*	28	11.46	1.99
	F(2,72)=3.27(p<.05)	GP02	25	9.80	3.10
		Out	22	9.81	3.00

*GPO phased-out

Quiz scores were compared using one-way analysis of variance. No significant differences ($p<.05$) emerged for the three groups on the first five quizzes; students in all three groups improved their performance slightly on successive quizzes. They began missing an average of four items on the first quiz. By quiz five their error rate averaged three items. Thus, both graphic organizers and outlining served as equally effective strategies for deeply processing text concepts when students were required to use either strategy. However, we were also interested in exploring the degree to which students would use the strategy they learned and its effect on their comprehension when they were not required to use outlining or graphic organizers. Quiz six provided a measure of students' unprompted use of the strategy they learned.

On quiz six, students in the graphic organizer group that received 14 weeks of previous summarization and question-generation training achieved significantly higher quiz scores than the new graphic organizer and outlining groups, $F(2,72)=3.27(p<.05)$. Apparently previous training in how to selectively read and summarize world history text gave the students in the first graphic organizer group an advantage that manifested itself in independent study reading.

A second dependent measure sought to appraise students' attitude toward outlining or graphic organizer construction. A six-item Likert scale was constructed and administered to a total of 68 students in the three groups. The scale, reproduced below, focused on the degree to which students planned to use the strategy they learned in future classes. A total score of 30 was possible.

Name____________________________

Date____________Period________

DIRECTIONS: Read each of the statements below. Circle the letter that best expresses your opinion using the following key:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree

1. I learned a process for graphing ideas or listing key points that I plan to use in other classes. SA A U D SD

2. I learned a process for graphing ideas or listing key points that can only be used in world history. SA A U D SD

3. I learned a process for graphing ideas or listing key points that is no better than simply rereading. SA A U D SD

4. I learned a process for graphing ideas or listing key points that I can use in college. SA A U D SD

5. I learned a process for graphing ideas or listing key points that is no better than the one I was already using. SA A U D SD

6. I learned a process for graphing ideas or listing key points that helped me remember world history material. SA A U D SD

Students in the two graphic organizer groups displayed significantly more positive attitudes toward the strategy they were taught than the outlining group, $F(2,65)=6.57 (p<.01)$. Means and standard deviations for the three groups are presented in Table 2.

Table 2

Mean Attitude Toward Strategy Learned Based on a Six-Item Likert Scale

Group	N	Mean	Standard Deviation
GP01	24	23.33	3.39
GP02	19	23.00	3.57
Out	25	19.68	4.43

A third dependent measure explored the effect of studying a difficult text passage using either outlining or graphic organizers in order to write a succinct summary. Since the first five quizzes resulted in no significant differences between outlining and graphic organizer groups on 10th grade world history text, we gave students a college level passage. We reasoned that graphic organizers might be most helpful to students in genuinely challenging material.

The selection we chose was a 919 word passage from Civilization Past and Present (Wallbank, Taylor, Carson, & Mancall, 1969). Its Raygor (1977) readability rating was college level. The passage dealt with "interpretations of the Industrial Revolution including Toynbee's view and more recent theories. Technical vocabulary, concept density, and text structure were all complex as the following excerpt illustrates.

> In the early eighteenth century this Eotechnical phase began to be superseded by what is sometimes called the Paleotechnical phase, which was unique in its exploitation of new forms of energy and new raw material and which called for new forms of economic and social organization. (p. 164)

The opening section of the passage introduced background details concerning the 1700s. The main idea or gist of the passage is finally expressed in the last paragraph:

> The Industrial Revolution cannot properly be narrowed to any single aspect of the thoroughgoing reorganization of society that took place in the nineteenth century. The agrarian revolution--meaning enclosure and the extensive introduction of scientific in place of unscientific culture--that Toynbee insisted accompanied the Industrial Revolution, and the expanded use of nonhuman power were as essential--if not as spectacular--as the machines and the factory system. (p. 165)

Thus, in order to construct a succinct summary the reader had to improve upon the order of ideas as they were presented in the original passage. Simply following the original text structure would not allow for the selection of major ideas. Such a summary would tend to include supporting details without the major ideas that bind them together.

Students in each group were given 10 minutes to read the passage. They then had an additional 25 minutes to use the study strategy they had been taught (i.e. graphic organizers for two groups and outlining for the other group). Following this study time they were given 15 minutes to summarize the passage. Both their graphic organizer or outlining efforts and their summaries were collected for analysis.

Student summaries were first scored by the teacher using the following point system based on the teacher's expert summary of the passage.

A) Toynbee's views = 10 points

B) Modern view = 10 points

C) Mentioning that "many factors" causes the Industrial Revolution = 5 points

D) Economic History = 5 points

E) Mentioning the "thoroughgoing reorganization of society" resulting from the Industrial Revolution = 5 points

F) Background information on the 1970's (first paragraph = 1 point per item

Thus a student could achieve a total summary score in excess of 35 points though this would be unlikely in a short summary. Indeed, only one student received a score higher than 35; it was 37.

The first author scored a random sample of five summaries from each group. Interrater reliability for these 15 student summaries was .90. The teacher's scores for each group were then contrasted in a one-way analysis of variance. Table 3 provides the means and standard deviations for the three groups.

Table 3

Mean Summarization Scores on a College Level
Passage Concerning the Industrial Revolution

Group	N	Mean	Standard Deviation
GP01	26	23.73	7.96
GP02	19	19.10	7.31
Out	20	17.40	8.56

The grapic organizer group with prior experience in summarization (Bean et al., in press) achieved a significantly higher mean score than the outlining group and the graphic organizer group using this strategy during the past 14 weeks, $\underline{F}(2,62)=3.93(\underline{p}<.05)$. Both graphic organizer groups achieved higher mean scores than the outlining group although a post hoc Scheffe test revealed only a significant difference favoring the graphic organizer group with prior summarization training. The more recent graphic organizer group and the outlining group were not significantly different at the conventional level.

Thus, students who were able to use a graphic organizer to reconstruct the passage had an advantage over the outlining group. This advantage was significant if they had prior training in how to write a well-structured, succinct summary. An analysis of the effect produced by the graphic organizer treatment for this group yielded an eta coefficient of .33. This is a medium effect size comparable to findings in the small number of other studies exploring student constructed graphic organizers (Moore et al., 1980).

The advantage enjoyed by the group of students with prior summarization training becomes more apparent when their summaries are analyzed for length, a measure of succinctness (Bean et al., in press). Table 4 provides means and standard deviations on this measure.

Table 4

Mean Summarization Length on a College Level
Passage Concerning the Industrial Revolution

Group	N	Mean	Standard Deviation
GP01	26	93.53	25.08
GP02	20	103.00	40.76
Out	19	118.84	38.12

Students with training in both summarization and 14 weeks of instruction in graphic organizer construction wrote more succinct summaries than the other two groups, _F_(2,62)=2.97(p<.10). Although this contrast did not reach significance at the conventional level the trend is apparent.

Student comments offered to the teacher just after completing the summarization task were also revealing. Students in the outlining group reported difficulty in deciding where to begin their summaries. Since their outlines follow rather than reconstruct the passage, this problem is not surprising. The graphic organizer scheme portraying background information, major events, and results used by the other two groups encouraged greater analysis of the passage and facilitated summary writing.

Discussion

Two groups of 10th graders who received direct instruction in graphic organizer construction successfully expanded their limited repertoire of study strategies beyond outlining. The group with previous training in summarization and question-generation (Bean et al., in press) outperformed a second graphic organizer group and an outlining group on quiz six. Students prepared for this quiz without teacher prompting to use the strategy they were taught. The group with previous training also achieved significantly higher scores than the other two groups on a summary task involving a difficult, college-level passage.

These findings led us to conclude that systematic instruction in graphic organizer construction was beneficial for both groups of average and above average 10th graders. It was most beneficial for the group with previous metacognitive training. Students in this group became adept at using graphic organizers to independently study and summarize challenging history text.

The success of the first group is directly related to the systematic nature of the instruction they received and their prior training in summarization. Using an explicit, rule-governed procedure based on Kintsch and van Dijk's (1978) macrorules for text comprehension allowed us to improve upon earlier efforts aimed at teaching students to construct graphic organizers (Moore & Readence, 1980). Students developed an awareness of text structure features that contributed to their graphic representations of historical events and, more importantly, the results of these events. Rather than simply listing major ideas and subordinate details in a linear outline, students in the graphic organizer groups had to sort and reconstruct text concepts in order to depict their interrelationships. This process required higher order thinking and, as a consequence, encouraged integration, retention, and retrieval of text concepts. In contrast, outlining may encourage lower level rehearsal or rote memorization of text information.

The power of systematic instruction in a process for visually reconstructing text concepts has also been demonstrated with below average students. Geva (1983) used explicit instruction in text structure signal words that foreshadow causal relations (e.g., "due to, because" etc.) to teach less able community college students paragraph flowcharting. They became skilled at flowcharting causal relations in paragraphs with subsequent improvement in their reading comprehension.

The duration of metacognitive instruction received by the first group also contributed to their ability to apply this strategy successfully. Most training studies in metacognition run a few days, or at best, a few weeks (e.g. Adams, Carnine, & Gersten, 1982). We found that teaching average and above average students a complex metacognitive process for selectively reconstructing text concepts using graphic organizers takes at least 14 weeks. This time frame includes teacher modelling, small group and individual application with frequent feedback, and finally, unprompted application of the strategy. Our initial study (Bean et al., 1983) confirmed our presumption that it would take a long instructional time period to modify secondary students' ingrained study habits. In that study we taught students to summarize text information. The current study on graphic organization taught the same students to perceive relationships among the information that would constitute their summarization. Use of these two strategies had a complementary effect. Thus, the group with a full prior semester of metacognitive instruction in summarization benefited most from subsequent instruction in graphic organizers. We were not surprised at this cumulative effect of metacognitive instruction. When we began our series of studies we formulated the hypothesis that students had to learn a series of strategies, each would require several weeks or months to learn, and effect of the strategies would be cumulative.

Each instructional treatment was done under controlled conditions and evaluated separately. This procedure provided a way of evaluating treatments over the long term duration required for learning a series of complex strategies. We intend to continue to use it as a model for our future research on cumulative learning of metacognitive strategies.

Finally, students in the graphic organizer groups displayed a significantly more positive attitude toward the strategy they learned than the outlining group. Secondary students are eager to expand their metacognitive strategies. Indeed, two of the students in the first graphic organizer group reported using this strategy in their biology class, especially on difficult sections of the text. This unprompted, independent effort to transfer the use of graphic organizers to other content areas suggests that when students have adequate time for learning a complex strategy, they are more likely to be able to learn it so well they can apply it in a novel situation.

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Comments on Anaheim's Summer Workshop
for
Learning from Text
Lake Arrowhead Conference

by

Laura Moore

Anaheim Union High School District

In the Anaheim Union High School District where a formerly majority school population is gradually changing to a minority population, new ways of teaching content are needed. Teachers who were trained to teach average and high achieving student now must provide appropriate instruction for low achieving students including many learners with little English proficiency. The district's instructional services staff has been concerned with finding appropriate teaching methods to provide for the needs of all students served.

The project dealing with Learning from Text originated when the district's director of instructional service, M. Jene Mangan, heard Tom Bean of California State University, Fullerton, presenting various strategies to enhance content area reading skill. These vocabulary and comprehension strategies developed by Learning from Text authorities seemed suitable additions to the teaching repertoire of teachers who must meet the needs of students not ready to deal with the content they are required to learn. A three year inservicing and implementation project was developed for the district with Tom Bean serving as consultant. Initial planning took place during the spring of 1982 with a reading steering committee composed of Dr. Bruce Hauger, assistant superintendent educational services, Jene Mangan, and three reading teachers (Mary King, Laura Moore, and Kathy Schymick). After the Learning from Text Project was adopted, Tom Bean met with this group to develop a plan for the inservices and select strategies and materials to be presented.

The three-year plan for inservicing content area teachers in the district included summer workshops where one teacher from targeted grades from each content area in the district would be selected to participate. During the first summer (1982), one seventh or eighth grade teacher from each subject area including art, business education, English, foreign language, home economics, industrial arts, mathematics, physical education, science, and social studies received from Tom Bean instruction in and demonstrations of contemporary vocabulary and comprehension strategies. Following these procedures, the teachers produced lessons using the highlighted strategies and demonstrated those lessons to the workshop participants. The three reading teachers from the reading steering committee served as facilitators during the summer project.

Those lessons produced during the workshop were compiled into a Learning from Text Course of Study. This resource was distributed to all seventh and eighth grade teachers at a meeting held prior to the start of instruction during the 1982-83 school year. At that meeting

Tom Bean gave an overview of the summer seminar focusing on how the use of these strategies could enhance instruction in all areas. Then all those who participated in the workshop gave short introductions to some concept of Learning from Text to highlight the resource material. One purpose of the meeting was to identify those teachers now trained in these strategies so they would be used as resources on their own campuses and with district colleagues in their subject areas at curriculum meetings during the year.

The second summer workshop was conducted during June 1983 with a teacher from art, business education, driver education, English, foreign language, home economics, mathematics, music, physical education, science, social sciences, and work experience. These participants teach ninth or tenth grade students at various high schools in the district. Again, Tom Bean led the training in a format similar to the 1982 workshop. Reading team leaders Mary King and Laura Moore worked with the teachers as they produced lessons to be used in their classrooms and shared in the Reading--Learning from Texts Course of Study. This resource will be distributed to selected high school teachers in a meeting in September 1983 with Tom Bean and the workshop participants giving an introduction to these vocabulary and comprehension strategies. During the summer of 1984, a third group of teachers who deal with eleventh and twelfth grade students will be trained.

The decision to use Tom Bean, a reading authority from California State University, Fullerton, gave distinction to the project. Dr.

Bean was able to develop rapport with content area teachers who when first involved were not convinced of the applicability of using reading strategies in their content areas. His presentations eased them into acceptance of the concept that each teacher must include instruction in how to learn in his course of study. Tom Bean's association with a nearby university gives district teachers a source for further professional study in the area of Learning from Text. Hopefully, teachers will enroll in some of these courses. the district was fortunate to gain this specialist's contributions to its training process.

The cross-curriculum format of the summer workshops offered an opportunity for teachers to gain respect for one another's subject areas. During the demonstration lessons, not only new possibilities for ways to incorporate various strategies were revealed, but the depth of the curriculum in many subject areas surfaced. As vocabulary and concepts emerged from areas such as home economics, physical education, or music, the participants could serve as involved learners in an area not generally studied by them. These participants may no longer be part of the attitude that only their selected discipline is important in the educational process as they acquire an acceptance of cross-curriculum learning and/or teaching in secondary education.

The impact of this project on classroom instruction has not been measured. No monitoring of those teachers who have been trained was planned so individual successes using these strategies are determined only through informal evaluations. The teachers from the 1982 workshop share adaptations of these techniques when encountering other participants. These shared lessons seem to give evidence of successful implementation. Enthusiasm for Learning from Text strategies endures, but a planned program to use the resource teachers to train others in their subject areas needs to be implemented.

Some inservices, however, were held during the 1982-83 school year including a half day session on Reading in Text for the science and mathematics teachers of the district and a short inservice for the bilingual teachers during their summer workshop. A Learning from Text project at Anaheim High School, funded through the School Improvement Program, gave training to the entire staff at that high school and included further workshops for selected teachers. A resource guide that included sample lessons was shared following this project. Since the district has mandated reading and writing across the curriculum to be emphasized on every campus, the Learning from Text project should receive more emphasis during the 1983-84 school year.

As the Learning from Texts project continues in the Anaheim Union High School District, the ultimate goal is to gain acceptance for such learning emphasis and see the strategies incorporated into lesson plans in every subject area. The district has used teachers from every subject area in the workshops, and all participants have found teaching strategies which are useful in their subject areas. As Anaheim Union High School District strives for educational excellence, this project should provide its staff with options that will enable students to learn more successfully.

Friendly Texts

by

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Friendly texts contain features that facilitate comprehension. For example, compare the two expository texts below. Which one is friendly, that is, helps you to understand the explanation?

Text A

Explanation of Earthquakes

> The earth is made up of three layers: The surface is a crust. The continents lie on the surface surrounded by water. Next comes a layer called a mantle. Below it is a core of hot liquid iron. The hot liquid rises up towards the surface. As it does, it moves the continents. This movement is the cause of earthquakes.

Text B

Explanation of Earthquakes

> The earth is made up of three layers: The surface is a crust. The continents lie on the surface surrounded by water. Next comes a layer called a mantle. Below it is a core of hot liquid iron. The hot liquid rises up toward the surface like bubbles in a pot simmering on a stove. As it does, it moves the continents. This movement is the cause of earthquakes.

We assume that you'll find Text B is friendlier. The only difference between Text A and Text B is that Text B has an analogy "like bubbles in a pot simmering on a stove." This analogy helps you relate the movement within the earth to your prior knowledge, which you can then use to help you comprehend the cause of earthquakes.

The features of texts that make them friendly fit into five categories: (1) text organization, (2) explication of ideas, (3) conceptual density, (4) metadiscourse, and (5) instructional devices.

Text organization refers to the purpose and arrangement of information in the text. Friendly authors often state in the introduction to a text their purpose in writing it, their logic for the organization of chapters or major parts of the text, and how readers should read and learn from the text. One major feature of text organization is discourse consistency, a uniform style of writing and presenting information. For example, a text may attain discourse consistency by using the same rhetorical devices throughout the text, such as question followed by an answer; statement of a problem and presentation of a solution; a sequence of events related in their order of occurrence; an argument with evidence presented for and against a point of view, followed by a summary or a conclusion; and a comparison-and-contrast pattern in which the similarities and differences between two objects or ideas are stated.

Another major feature of text organization is its cohesiveness, the way information is tied together from sentence to sentence, paragraph to paragraph and chapter to chapter (Grimes, 1975). Any grammatical element can serve to relate one sentence to another. These elements, known as anaphora, are of four types: (1) substitutions of words, such as a pronoun for a noun; (2) repetition of words, using the same word or words again in a subsequent sentence; (3) summary of previous words; for example, after using three feminine names, such as Jean, Nancy, and Patricia, in one sentence, referring to them as *the girls*, and (4) deletion of previously stated words or ideas, such as *Stephen raised his hand and so did Beverly* (raise her hand). The following paragraph contains all four types:

> Hallie and Ruth are identical twins. *Both* are elementary teachers. Two years ago Hallie won the outstanding teaching award for *her* school. This year Ruth won (it). *They* are *both* working towards Ph.D. degrees so that *they* can become the *best* teachers possible. *Their* mother, also a teacher, inspired *them* to achieve this *goal*.

Conjunctions, such as and, but, therefore, etc., also interrelate not only sentences, but larger units of discourse, such as paragraphs. Unlike anaphora, they also provide ideational cues for the reader. For example, *and* indicates the *addition* of another idea or object, *but* implies subtraction, as "all *but* Douglas had a turn," *therefore* implies a logical consequence to a sequence of events or signals the reader that a conclusion to an argument is about to be presented. Rhetorical devices, such as problem-solution, question-and-answer, and cause-and effect patterns can operate within paragraphs and can tie together even larger sections of texts. Reviews of previous sections of text, frequently occurring as summaries at the end of a chapter or beginning of the next chapter, are a type of repitition that ties the chapters of a text together.

Explication of information means to state directly, instead of requiring the reader to infer, organize, or construct relationships. For example, a high school history text described the French, English, Russian, and American revolutions, but did not state what they had in common or give any explanation of the conditions under which revolutions occur. In short, the text provided only descriptions of the four revolutions. Another example is a biology text that states the differences between arteries and veins, but does not explain why they differ (Bransford, 1984).

The usual rule in text-writing is to define new terms as they are introduced. They should, of course, be defined by words that are familiar to the student. The terms should also be listed in a glossary.

Texts can be more comprehensible if they provide necessary background knowledge or show students how new ideas in the text are related to knowledge students already have. Some texts achieve this purpose by introductions that contain familiar examples. Another way to relate new knowledge to prior knowledge is through the use of analogies or figurative language.

Underlying many texts is some organizing theory or explanation. For example, high school chemistry texts can take three different approaches to chemistry: descriptive, principles, or theoretical. College texts also may be based upon a particular viewpoint. For example, Samuelson's leading text is based on Keynesian economics, and Bijou and Baer's Child Development is based on Skinner's reinforcement theory of learning. If a theory-based text explicates its underlying theory, readers would be able to use it to organize and retain better the multitude of applications and interpretations presented in the text.

Whether students should read and remember the text at a theory level or only at a descriptive level is a decision the instructor of a course should make. Some authors help their readers by pointing out their text can be approached from either or both levels of comprehension.

Conceptual density refers to the number of new ideas and vocabulary that are contained in the text. Some high school texts may have as many as 4000 technical words in their glossary. In an effort to be comprehensive, perhaps to satisfy content guidelines and economic criteria for adoption of texts, and because of the knowledge explosion, particularly in technical fields, high school texts have become burdensome. Writers can help readers comprehend these texts by spacing out the presentation of information. They can do so by following the rules of good paragraph writing: introduce a main idea, clarify it, and give several examples. Texts written this way will be clearer, but longer than terse texts that in essence may state only one main idea or generalization after another, as you would find in a summary of a text. Such texts may be understood by instructors who can generate their own clarifications and examples, but not by students. The students need the wordier text to bridge the gap between their own knowledge and experience and the new knowledge in the text (Pepper, 1981). A possible remedy would be the adoption of a sequence of several texts, instead of one text for a year-long course.

Metadiscourse literally means that the author is talking directly to the reader about the information in the text. The author might point out the purpose or goal of the text, what information is essential for achieving it, advise readers on how to learn from the text, and show readers how to apply information gained from the text to other situations (Rothkopf, 1966; Anderson, Osborn, and Tierney, 1981; Singer, 1983). Knowing some readers may have a limited background, the author might provide this information, much as a teacher might add clarifying information or comments to a text.

In general, metadiscourse is like a conversation between the author and the reader about the text (Crismore, 1983). It may take the form of an I-You dialogue. I think you will find that texts and even scientific reports are getting away from the third person, passive tense that omits the agent for the action. Instead of saying, "It was found that something occurred" you are more likely to find, "I found that..." or "Stephen discovered that..."

Instructional devices are those features of a text that aid the reader to comprehend the text. A table of contents indicates the text's sequence of ideas. Other organizational aids are the use of headings and subheadings. Since knowledge of vocabulary is the best predicter of comprehension, a glossary facilitates achievement of this goal. The terms in the glossary should be presented in bold faced type and defined in the text as they occur. Another helpful feature is an index that groups related ideas in the text. Authors also reveal to readers where the text is going by providing an overview either in verbal or graphic terms. Use of questions at the beginning of chapters arouse students' curiosity and focus attention on essential information. Friendly texts use diagrams, tables, and graphs that enable readers to perceive relationships among ideas, objects, or numerical data. Authors of friendly texts annotate their own text, sometimes printing information in the margins, usually background knowledge, but more often this information is written right into the text. Summaries and conclusions indicate the essential information in the text; problems or questions at the end of chapters help students test their understanding of this information. But sometimes the questions or problems may not be relevant or may be too easy or difficult to help the readers. Since transfer, ability to apply knowledge gained to new situations, is a major purpose in learning, friendly texts will facilitate it by providing suggestions for application of the text's knowledge to new situations.

These features of a friendly text are restated at the end of this article in a list of criteria for selecting friendly texts. Although some text features play a more important role than others in facilitating comprehension, we do not yet have any basis for differential weighting. Nor have we any criterion for stating when a text shifts from the unfriendly to the friendly end of the continuum. We can only say that a text with more of these features is more likely to facilitate comprehension than a text with fewer features.

But we do know that whether a text is or is not friendly depends not only on the features within the text, but also on its position within a curriculum and the role that a teacher plays in using the text, particularly how the teacher adapts the text to individual differences among students in a class (Flood, Lapp, Singer, and Mathison, 1985). Finally, comprehension of a text depends upon an interaction between the information in the text and the resources the reader can mobilize in response to the task-demands of the text and his or her purpose in reading the text (Singer and Bean, 1982). We shall clarify each of these extra-text determinants of comprehension.

Determinants of Comprehension Outside the Text

Curriculum Consideration

In evaluating a text, we presume it is consistent with a sequence of instruction and fits into the next step in the student's knowledge development. In short, a text should start at a knowledge level that the student has already attained and take the student systematically on to a higher and more abstract stage in the acquisition of knowledge, including knowledge of concepts, events, and contexts. Moreover, we presuppose that the prior curriculum has been sequential and hierarchically organized. We also assume that students have progressed through this curriculum and have acquired the content, processes, and skills taught in it. Consequently their background knowledge and ability to learn from text have been adequately developed by prior school levels; the students are therefore ready for a higher level of development. If these conditions are met, then we can determine whether a text has the necessary characteristics to facilitate the student's next stage of development. Whether the facilitation is realized also depends upon the teacher.

Teacher's Role

A teacher plays a role in all aspects of learning in a classroom setting: showing students how to learn in the particular content area and from the text (MacGinitie, 1981), designing materials to aid students' ability to learn from text (Herber, 1978), motivating students by explaining the relevance of the course to their knowledge development and to applications in everyday life, explicating and clarifying the text, relating text information to the students' prior knowledge, providing a context for comprehending the text, assigning tasks that help students use and therefore retain information presented in lectures and in the text, providing relevant tests at appropriate points in the course so that students can gain knowledge of their progress and information on their strengths and weaknesses. Indeed, a teacher can make friendly and unfriendly texts more comprehensible to students (Flood, Lapp, Singer, & Mathison, 1985).

Briefly summarized, coherence among all four components of a classroom (students, text, test, and teacher) enhance achievement (Singer, 1982). Ecological factors, conditions inside and outside the classroom that students are experiencing, also affect their performance in the classroom (Singer and Bean, 1982).

Individual Differences

Although a text may be appropriate and friendly to a particular reader, it is not likely to fit an entire class of students. Any heterogeneous class varies greatly in its ability to learn from text, whether the class is at the first grade or at the college level. The range in achievement at the first grade is four years, but gradually expands until at the twelfth grade it is 12 years. Hence, a friendly text can at best fit only students at a particular level of development. The teacher's task is to adopt instructional strategies that will enable all students within the class to successfully interact with and learn from a text. Single and multiple text strategies that teachers can use for helping students learn from text can be found in such textbooks as Reading and Learning from Text (Singer and Donlan, 1980) and Reading in the Content Areas: Improving Classroom Instruction (Dishner, Bean, Readence, and Moore, 1985).

Interaction Between Text Information and Reader Resources

However, comprehension does not depend upon the text alone. Comprehension is the construction of meaning that results from an interaction between the texts's features and the reader's resources (Rumelhart, 1976; Singer, 1983), in accordance with the perspective and purposes of the reader (Holmes and Singer, 1966; Pichert and Anderson, 1977). The features of the text activate the relevant resources a reader can command for constructing meaning for the text. For example, the text's metadiscourse can lead a reader to select a particular goal and adopt a particular perspective and purpose for responding to the text. Reader resources are the reader's prior knowledge, abilities, purposes, perspectives, interests, attitudes, values, and feelings.

Readability Formulas

Readability formulas, such as Fry's graph for estimating readability shown on p. 215, usually consist of two factors: sentence length and word difficulty. Sentence length is an index of syntactic complexity while word difficulty is an estimate of the semantic level of a text. These two criteria subsume some textual organization and conceptual density features, but not the teaching features of explication, metadiscourse, and instructional devices, nor extratext determinants of text-reader interactions and the teacher's role in compensating for unfriendly text features, developing or enhancing reader resources, and facilitating text-reader interactions.

However, readability estimations are useful for placing texts at a given point in a graded curriculum. But the standard error of any readability formula is plus or minus about 1.5 grade levels. For example, a readability level of 4.7 really represents a readability range that can vary from 3.2 to 6.2. In short, a readability level is only a gross indicator of a text's difficulty.

Although readability estimates are useful for placing a text within a graded curriculum, they do not specify the specific features that make one text friendlier than another, nor do they indicate the interactions between the text and the reader, nor the role that teachers can play to enhance a reader's comprehension of a text. Hence, determination of a text's readability level is only a first step in estimating a text's friendliness. The next step is to evaluate the friendliness of specific features of a text. Finally, if a prediction is to be made on how well students in a classroom situation are likely to comprehend a text, then a third step is to determine how a particular teacher is likely to enhance the friendliness of a text, readers' resources, and the interactions between the text and the reader. However, we now only have scales for estimating the first two steps; we need another scale, a teacher text-reader enhancement scale before we can act on the third step. In the meantime, we can carry out the first two steps by (1) using the Fry graph to estimate readability level and (2) the Friendly Text Evaluation Scale to determine the comprehension facilitation of a text.

Summary and Conclusion

We have presented criteria for determining the friendliness of a text. But we have also pointed out that a friendly text presupposes a reader with the necessary resources for interacting with and constructing meaning for the text, a curriculum that has adequately developed these resources, a teacher who can favorably influence the interaction between readers and the text and whose tests provide appropriate and timely feedback on the results of this interaction, and an environment that is conducive to learning from text. If these presuppositions are valid, then it is possible to use the following evaluation scale to determine a text's friendliness.

Friendly Text Evaluation Scale

Directions: Read each criterion and judge the degree of agreement or disagreement between it and the text. Then circle the number to the right of the criterion that indicates your judgment.

1 SA = Strongly Agree
2 A = Agree
3 U = Uncertain
4 D = Disagree
5 SD = Strongly Disagree

I.	Organization	SA	A	U	D	SD
1.	The introduction to the book and each chapter explain their purposes.	1	2	3	4	5
2.	The introduction provides information on the sequence of the text's contents.	1	2	3	4	5
3.	The introduction communicates how the reader should learn from the text.	1	2	3	4	5
4.	The ideas presented in the text follow a unidirectional sequence. One idea leads to the next.	1	2	3	4	5
5.	The type of paragraph structure organizes information to facilitate memory. For example, objects and their properties are grouped together so as to emphasize relationships.	1	2	3	4	5
6.	Ideas are hierarchically structured either verbally or graphically.	1	2	3	4	5
7.	The author provides cues to the way information will be presented. For example the author states: "There are five points to consider."	1	2	3	4	5
8.	Signal words (conjunctions, adverbs) and rhetorical devices (problem-solution, question-answer, cause-effect, comparison-and contrast, argument-proof) interrelate sentences, paragraphs, and larger units of discourse.	1	2	3	4	5

SA A U D SD

Discourse consistency

9. The style of writing is consistent and coherent. For example the paragraphs, sections, and chapters build to a conclusion. Or they begin with a general statement and then present supporting ideas. Or the text has a combination of these patterns. Any one of these patterns would fit this consistency criterion. 1 2 3 4 5

Cohesiveness

10. The text is cohesive. That is, the author ties ideas together from sentence to sentence, paragraph to paragraph, chapter to chapter. 1 2 3 4 5

II. Explication

11. Some texts may be read at more than one level, e.g., descriptive vs. theoretical. The text orients students to a level that is appropriate for the students. 1 2 3 4 5

12. The text provides reasons for functions or events. For example, the text, if it is a biology text, not only list the differences between arteries and veins, but also explains why they are different. 1 2 3 4 5

13. The text highlights or italicizes and defines new terms as they are introduced at a level that is familiar to the student. 1 2 3 4 5

14. The text provides necessary background knowledge. For example, the text introduces new ideas by reviewing or reminding readers of previously acquired knowledge or concepts 1 2 3 4 5

15. The author uses examples, analogies, metaphors, similies, personifications, or allusions that clarify new ideas and makes them vivid. 1 2 3 4 5

16. The author explains ideas in relatively short active sentences. 1 2 3 4 5

		SA	A	U	D	SD
17.	The explanations or theories that underlie the text are made explicit. E.g. Keynesian theory in Samuelson's economic text. Skinner's theory in Bijou and Baer's Child Development; behavioristic or gestalt theories in psychology texts.	1	2	3	4	5
III.	Conceptual Density					
18.	Ideas are introduced, defined or clarified, integrated with semantically related ideas previously presented in the text, and examples given before additional ideas are presented.	1	2	3	4	5
19.	The vocabulary load is appropriate. For example, usually only one new vocabulary item per paragraph occurs throughout the text.	1	2	3	4	5
20.	Content is accurate, up-to-date, and not biased	1	2	3	4	5
IV.	Metadiscourse					
21.	The author talks directly to the reader to explain how to learn from the text. For example, the author states that some information in the text is more important than other information.	1	2	3	4	5
22.	The author establishes a purpose or goal for the text.	1	2	3	4	5
23.	The text supplies collateral information for putting events into context.	1	2	3	4	5
24.	The text points out relationships to ideas previously presented in the text or to the reader's prior knowledge.	1	2	3	4	5
V.	Instructional Devices					
25.	The text contains a logically organized table of contents.	1	2	3	4	5
26.	The text has a glossary that defines technical terms in understandable language.	1	2	3	4	5

		SA	A	U	D	SD
27.	The index integrates concepts dispersed throughout the text.	1	2	3	4	5
28.	There are overviews, preposed questions, or graphic devices, such as diagrams, tables, and graphs throughout the text that emphasize what is to be learned in the chapters or sections.	1	2	3	4	5
29.	The text includes marginal annotations or footnotes that instruct the reader.	1	2	3	4	5
30.	The text contains chapter summaries that reflect its main points.	1	2	3	4	5
31.	The text has problems or questions at the literal, interpretive, applied, and evaluative levels at the end of each chapter that help the reader understand knowledge presented in the text.	1	2	3	4	5
32.	The text contains headings and subheadings that divide the text into categories that enable readers to perceive the major ideas.	1	2	3	4	5
33.	The author provides information in the text or at the end of the chapters or the text that enable the reader to apply the knowledge in the text to new situations.	1	2	3	4	5
34.	The author uses personal pronouns that makes the text more interesting to the reader	1	2	3	4	5

Total ____ ____

SCORE

Add the numbers circled.

Score range: 34 to 170 points

Interpretation of scores:

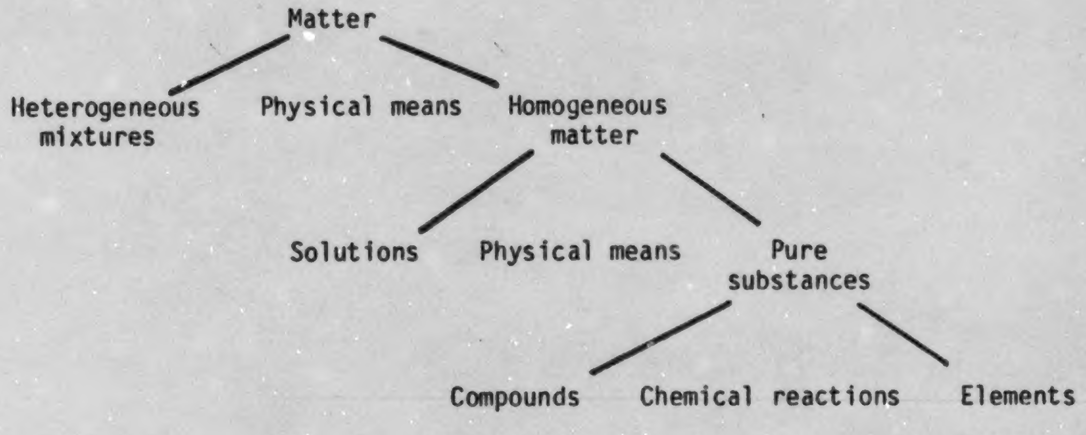
A score closer to 34 implies the text is friendly; scores closer to 170 suggest the text is unfriendly.

Examples

We have selected examples to illustrate some of our criteria. Space limitations preclude us from providing examples for each of them. However, some criteria are self-evident, particularly those listed under instructional devices. We have tried to formulate all of our criteria so that they can be readily applied. But some of them need to be clarified through the use of examples. The examples we have chosen come from freshmen college texts in chemistry and calculus. The chemistry texts are not equivalent: the friendly text is the main text for the course and the less friendly text is a laboratory manual for the introductory course.

Texts are not uniformly friendly or unfriendly. Indeed, our examples for friendly vs. unfriendly texts cross over for our two calculus texts. However, one of the calculus texts overall was friendlier than the other.

Friendly text



The classification of matter.

Any portion of matter that is uniform throughout is said to be homogeneous. Homogeneous mixtures are known as solutions. For example, when salt and water are mixed, a homogeneous mixture, or solution, forms. The salt is said to dissolve in the water. Mixtures that are not homogeneous are said to be heterogeneous. When water and clay are mixed, no solution forms; the resultant mixture is heterogeneous. A heterogeneous mixture can generally be separated by some physical means into homogeneous components[1]

Unfriendly text

The fact that different substances have different solubilities in a given solvent can be used in several ways to effect a separation of substances from mixtures in which they are present. We have seen in a previous experiment how fractional crystallization allows us to obtain pure substances by relatively simple procedures based on solubility properties. Another widely used resolution technique, which also depends on solubility differences, is chromatography.[2]

Example 1. Illustration of criterion 28: Use of a diagram to represent hierarchically structured ideas.

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[1] Theodore L. Brown and H. Eugene LeMay, Jr. Chemistry: The Central Science, 2nd Edition. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1981.

[2] Emil J. Slowinski, Wayne C. Wolsey, and William L. Masterton. Chemical Principles in the Laboratory with Qualitative Analysis. Philadelphia, Pennsylvania: W. B. Saunders, 1978.

Friendly text

PERIODIC TRENDS.

Much of the material in this chapter will be much clearer and easier to remember if you keep in mind several trends in physical and chemical properties that can be related to position in the periodic table. Some of the more important of these are illustrated in Figure 21.3. Recall that electronegativity increases as we move up in a given family, and increases from left to right across the table. As a result nonmetals have higher electronegativities that do metals. The tendency toward metallic character increases as we move downward in each group.[1]

Unfriendly text

Most solid chemical compounds will contain some water if they have been exposed to the atmosphere for any length of time. In most cases the water is present in quite small amounts and is merely adsorbed on the surface of the crystals. This adsorbed water can usually be removed by gentle heating. Other solid compounds will contain larger amounts of water that are bound to the compound more strongly. These compounds are usually ionic salts. The water present in these salts, called water of hydration, is generally bound to the cations in the compound.[2]

Example 2. Illustration of criterion 21: Metadiscourse occurs throughout the text represented by the passage at the top. No metadiscourse occurred in the second text. The lower passage is a typical introductory passage for the second text. Note that it does not contain any metadiscourse.

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[1] Theodore L. Brown, and H. Eugene LeMay, Jr. *Chemistry: The Central Science, 2nd Edition*. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1981.

[2] Emil J. Slowinski, Wayne C. Wolsey, and William L. Masterton. *Chemical Principles in the Laboratory with Qualitative Analysis*. Philadelphia, Pennsylvania: W. B. Saunders, 1978.

Friendly text

SUMMARY

Our major concern in this chapter has been the relationship between electron configurations and the properties of atoms, especially as organized by the periodic table. We saw that the electron configurations of many-electron atoms can be written by placing electrons into orbitals in the following order:

1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p,...

Subshells with a given principal quantum number, such as the 3s, 3p, and 3d subshells, do not have the same energies. This fact can be understood in terms of the screening effect and the average distance of an electron in each of these subshells from the nucleus.

The Pauli exclusion principle places a limit of two on the number of electrons that may occupy any one atomic orbital. These two electrons differ in their electron-spin quantum number, m_s[1].

Unfriendly text

Learning goals

Having read and studied this chapter, you should be able to:

1. List the factors that determine the energy of an electron in a many-electron atom. You should be able to explain the fact that electrons with the same value of principal quantum number (n) but differing values of the azimuthal quantum number (l) possess different energies.
2. Explain the concepts of effective nuclear change and the screening effect as they relate to the energies of electrons in atoms.
3. State the Pauli exlusion principle and Hund's rule and illustrate how they are used in writing the electronic structures for the elements.[2]

Example 3. Illustration of criterion 30: The first text, as shown above, used the instructional device of chapter summaries to emphasize the significant information presented in the chapter. The second text did not have any chapter summaries, even though the experiment could have been summarized.

Both texts had these instructional devices: table of contents, diagrams to illustrate objects, and problems at the end of the chapter.

[1] Theodore L. Brown and H. Eugene LeMay, Jr. Chemistry: The Central Science, 2nd Edition. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1981.

[2] Emil J. Slowinski, Wayne C. Wolsey, and William L. Masterton. Chemical Principles in the Laboratory with Qualitative Analysis. Philadelphia, Pa.: W. B. Saunders, 1978.

Friendly text

WHAT IS CALCULUS?

To a Roman in the days of the empire a "calculus" was a little pebble used in counting and in gambling. Centuries later the verb "calculare" came to mean "to compute," "to reckon," "to figure out." To the engineer and mathematician of today calculus is the branch of mathematics that takes in elementary algebra and geometry and adds one more ingredient: the limit process.

Calculus begins where elementary mathematics leaves off. It takes ideas from elementary mathematics and extends them to a much more general situation. Here are some examples. On the left-hand side you will find an idea from elementary mathematics; on the right, this same idea as enriched by calculus.[1]

Elementary Mathematics	Calculus
slope of a line $y = mx + b$	slope of a curve $y = f(x)$

Unfriendly text

Calculus is the mathematical tool used to analyze changes in physical quantities. It was developed in the seventeenth century to study four major classes of scientific and mathematical problems of the time:

1. Find the tangent to a curve at a point.
2. Find the length of a curve, the area of a region, and the volume of a solid.
3. Find the maximum or minimum value of a quantity--for example, the maximum and minimum distances of a planet from the sun, or the maximum range attainable for a projectile by varying its angle of fire.
4. Given a formula for the distance traveled by a body in any specified amount of time, find the velocity and acceleration of the body at any instant. Conversely, given a formula that specifies the acceleration or velocity at any instant, find the distance traveled by the body in a specified period of time.

These problems were attacked by the greatest minds of the seventeenth century, culminating in the crowning achievements of Gottfried Wilhelm Leibniz and Isaac Newton--the creation of calculus.[2]

Example 4. Criterion 16: Friendlier text states a general explanation and provides example, Criterion 15.

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[1] S. L. Salas and Einar Hill. Calculus: One and Several Variables. Part 1. Third Edition. New York: Wiley, 1978. p. 1.

[2] Howard, Anton. Calculus with Analytic Geometry: Brief Edition. New York: Wiley, 1981. p. xxi.

Friendly text

LIMITS (AN INTUITIVE INTRODUCTION)

In the last section we saw that the concepts of tangent and instantaneous velocity ultimately rest on the notion of a "limit" of "value approached by" a function. In this section as well as the next few we will investigate the notion of limit in more detail. Our development of limits in this text proceeds in three stages:

1. First we discuss limits intuitively.
2. Then we discuss methods for computing limits.
3. Finally, we give a precise mathematical discussion of limits.[1]

Example 5. Illustration of criterion 28: Friendly text provides an overview of the section. Also, criterion 14: The text relates prior to new knowledge.

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[1] Howard Anton. Calculus with Analytic Geometry: Brief Edition. New York: John Wiley, 1981. p. 85.

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Text Evaluation Checklist

by

Thomas W. Bean

California State University, Fullerton

Directions: List the intended grade level of the text. Compute an estimate of text readability using the Raygor (1977) procedure. Complete the 20 item checklist and apply the following scoring guide to determine the acceptability of the text for your students.

Scoring Guide

16 to 20 = Excellent

10 to 15 = Marginally acceptable; consider alternative texts

0 to 9 = Unacceptable; find another text

Title of Textbook:________________________________

Author(s):________________________________

Publisher:________________________________

Copyright date:________________________________

Cost:________________________________

Evaluated by:________________________________

1. From: Readence, J. E., Bean, T. W., 2 Baldwin, R. S. Content Area Reading: An Integrated Approach. Dubuque, Iowa: Kendall/Hunt Publishers, 1981.

A. READABILITY

_____ 1. Intended grade level of text: _____. Readability estimate: _____. Is the computed reading level realistic for the students who will be using the text?

B. FORMAT

_____ 2. The book is recently copyrighted and the contents genuinely up-to-date.

_____ 3. The text is suitable for achieving the stated course objectives.

_____ 4. The text contains a table of contents, index, and a glossary.

_____ 5. The table of contents indicates a logical development of the subject matter.

_____ 6. When the text refers to a graph, table, or diagram, that aid is on the same page as the textual reference.

_____ 7. Captions under graphs, tables, and diagrams are clearly written.

_____ 8. Pictures are in color and are contemporary, not dated by dress unless the author's intention is to portray a certain period.

_____ 9. Various ethnic groups, and male and female characters are depicted authentically in the text.

_____10. The text suggests other out-of-class readings and projects to stimulate additional student interest.

C. CONCEPTUAL ORGANIZATION

_____11. The main idea(s) or purpose for reading a chapter is stated at the beginning.

_____12. Difficult new vocabulary words are highlighted, italicized, or underlined.

_____13. Context clues and synonyms for difficult vocabulary are used in the text.

_____14. The writing is coherent in that ideas are clearly developed and related to each other, within and across paragraph boundaries.

_____15. New concepts are introduced by relating them to previously learned concepts so that the volume of new information doesn't frustrate students.

_____16. At times the text refers to practical, real-life situations students can relate to and have an interest in.

_____17. The text includes references to, and quotations from other sources and authorities to support its statements.

_____18. The authors include a summary at the end of each chapter.

_____19. When there are questions and activities at the end of a chapter, they elicit different levels of thinking ranging from textually explicit to experientially-based, problem-solving tasks.

D. STUDENT RESPONSE

_____20. Students generally view the text positively in that it is challenging but not frustrating. This can be determined, in part, by using the results of a cloze or maze test in combination with a Content Area Inventory (Chapter 5).

TEXT SCORE:________

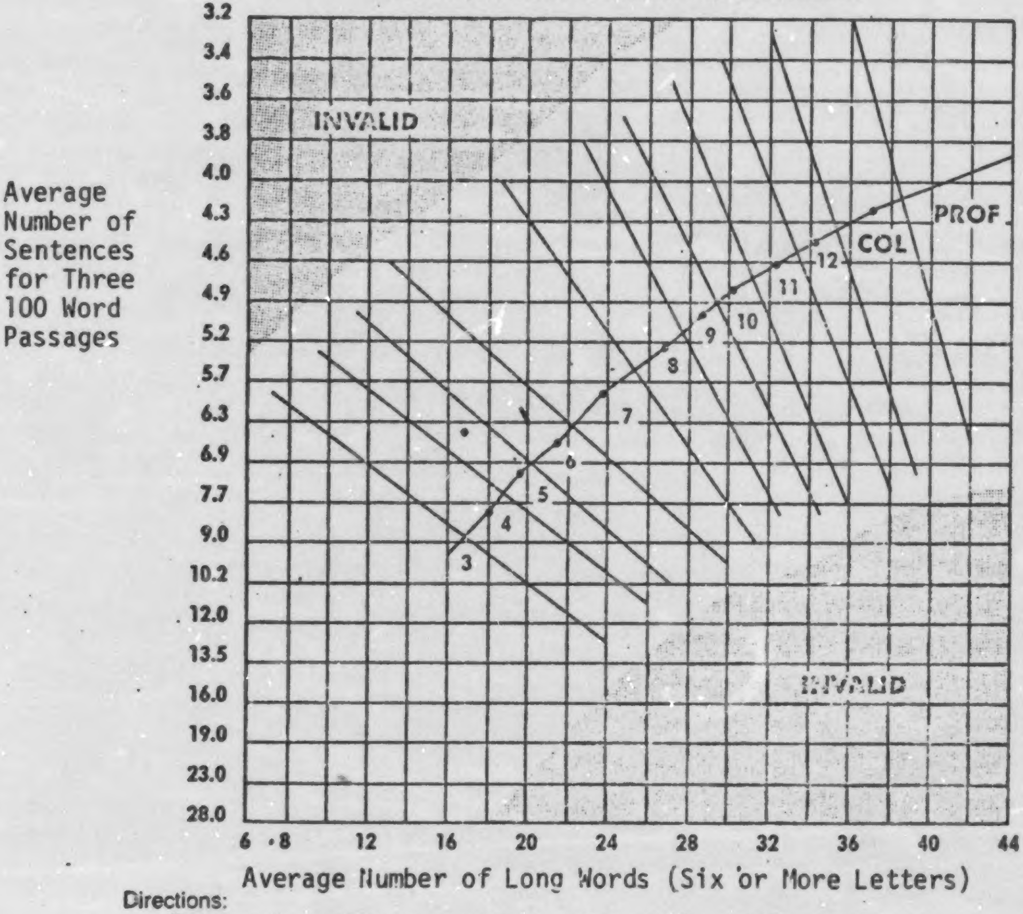
DECISION: ____________APPROPRIATE

____________MARGINALLY APPROPRIATE

____________UNACCEPTABLE

THE RAYGOR READABILITY ESTIMATE

ALTON L. RAYGOR—UNIVERSITY OF MINNESOTA



Directions:

Count out three 100-word passages near the beginning, middle, and end of a selection or book. Count proper nouns, but not numerals.

1. Count sentences in each passage, estimating to nearest tenth.
2. Count words with six or more letters.
3. Average the sentence length and word length over the three samples and plot the average on the graph.

Example:

	Sentences	6+ Words
A	6.0	15
B	6.8	19
C	6.4	17
Total	19.2	51
Average	6.4	17

Note mark on graph. Grade level is about 5.

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Inconsiderate Text:

Text Properties that Can Inhibit the Growth of Meaning

by

Judith A. Langer

University of California, Berkeley

A text is inconsiderate if it makes unwarranted demands on a reader, if it creates great cognitive demands without the conceptual payoff. Considerate text makes cognitive demands that are reasonable for the intended audience, the implied purpose, and the topic.

The following generalizations describe some ways in which inconsiderate text may cause cognitive gaps between the reader and the passage--gaps not directly related to how well the reader constructs meaning, but inherent in the way the text was composed.

1. DENSITY OF IDEAS

Texts can be inconsiderate in the number of ideas that are presented and the frequency with which they change. Barely enough information is supplied for one bit of the envisionment to develop when another concept is introduced. Look at the following example of a test passage meant for third grade readers:

> In 1877 a machine appeared which surprised many people. Can you guess the name of this strange new machine?
>
> As you spoke into the mouthpiece and turned the handle, a tube covered with a thin piece of tin moved around. As the tube moved, a needle pressed deep lines into the tin.

> As you turned the handle once more, the needle touched against the same lines and played back your words.
>
> This was the first phonograph! How different from the hi-fi of today.

The reader is asked to envision a mouthpiece, but before embellishing information is given, a handle is introduced. There is a range of schemata for "mouthpiece" but before the relevant one can be worked out, the "handle" appears. A series of central questions are set up with hypotheses about relationships between parts of the machine. Rather than finding resolutions to the questions and hypotheses, the text gets more dense until the answer to the riddle is finally provided. While the text sets up a series of unanswered questions and hypotheses, real readers attempt to make judgments more rapidly. Some students cling to their first envisionment and "fit" everything else. Others change their envisionment each time a new schema is introduced, but their ideas become disconnected. Still others accommodate the new concepts in ways that make idiosyncratic meaning to them. In any case the density of ideas introduced without elaboration becomes counterproductive to the development of a cohesive envisionment.

2. OVERRELIANCE ON ASSUMPTIONS AND HYPOTHESES

Some texts require the reader to make a large number of assumptions and hypotheses without immediate or corroborating textual evidence to permit their validation. The envisionment is developed from implications drawn from the ideal reader's instantiation of inarticulated referents and knowledge of social conventions. When too many abstractions in the form of assumptions and unresolved hypotheses are presented in a brief text, uncertainty builds. New suppositions are linked with old ideas and the reader is induced to conjure up a strained envisionment of vague images. The following passage is from a high school reading test:

> "Alice!" called a voice.
>
> The effect on the reader and her listener, both of whom were sitting on the floor, was instantaneous. Each started and sat rigidly intent for a moment; then, as the sound of approaching footsteps was heard, one girl hastily slipped a little volume under the coverlet of the bed, while the other sprang to her feet and in a hurried, flustered way, pretended to be getting something out of a tall wardr[illegible].
>
> Before the one who hid the book had time to rise, a woman of about fifty entered the room and, after a glance, cried, "Alice! How often have I told you not to sit on the floor?"
>
> "Very often, Mommy," said Alice, rising meekly, meantime casting a quick glance at the bed to see how far its smoothness had been disturbed.
>
> "And still you continue such unbecoming behavior."
>
> "Oh, Mommy, but it is so nice!" cried the girl. "Didn't you like to sit on the floor when you were fifteen?"

The reader must hypothesize the antecedents for many referents throughout the passage, beginning in the very first sentence with "a voice", in the second sentence with "the reader" and "her listener" and so on. Assumptions based on social conventions must be made that the teenage girls were reading a "forbidden" book and that the mother and daughter are talking across each other concerning the book and the floor sitting. The actions (reading the book, hiding it, rising, glancing at the book) are all linked by inference. While these can be powerful stylistic devices in mysteries and romance novels, they become inconsiderate for texts of other genre.

3. IMITATION GENRE

School texts are in many ways like the actual genre they are meant to portray, but can also be quite different. Because texts are often created to instruct, they are often quite different from the historical, scientific, or literary pieces found in "field" books where authors write trade books to share their knowledge with an interested audience. Because textbooks are designed with special instructional and content goals in mind, these passages sometimes violate the conceptual or structural patterns typically associated with their original genre. The following third grade test passage is an example:

> The nose cone of a rocket carries the payload. The payload is anything men wish to send into space.
>
> The payload can be a satellite. A satellite is a small object that travels around a larger object in space. The rocket travels fast to carry the satellite away from the earth.
>
> The payload can be a camera. It can take pictures of the earth of the moon. The payload may be a man, shooting through space.

Unlike real exposition, there is no introduction to help the reader link personal knowledge to text information and the passage ends abruptly without a statement tying the content together. Here the departure from the normal genre leaves the reader without a context for constructing the envisionment. There is not a sharing of rocket informmation, but a simple listing of key points. The reader who is familiar with the topic may be able to recognize these points, elaborate, and connect them to make sense of the passage. The reader who doesn't will be at a loss. In an attempt to portray the genre encountered in trade books, passages of this sort often become imitations or simulations of the original genre--almost a genre unto themselves. It is this imitation that causes them to invoke conventions they don't necessarily follow.

4. ASSERTIONS CONTRARY TO READER'S BELIEFS

Sometimes texts make assertions contrary to readers' beliefs, neither acknowledging the difference in ideas nor providing the schematic links from reader knowledge to the text content. Therefore, when the text moves on to set up hypotheses, the reader is not prepared to move on based on the assumptions with which they disagree. The following fifth grade passage makes such an assertion:

> Games of great speed and constant motion, such as football, basketball, and ice hockey, have been gaining in popularity, while attendance at baseball games has been falling off. This is largely because the game of baseball is slower and its action irregular. That is, the game alternates between great moments of high drama and excitement--such as when the bases are loaded and the batter hits a home run--and extended periods of comparative inactivity, such as when a batter takes full count, two strikes, and three balls, and then is walked on the last pitch. Many ideas are being explored for making baseball a faster game. One possibility, for example, might be to increase the distance

> between the pitcher and the batter, thereby allowing a split second more for the batter to judge the pitch and connect with the ball. This could produce more hits, thereby making baseball more of a running rather than a pitching game.

Readers often find this text jarring because they regard baseball as a very popular game with high attendance. Because of this, they have difficulty accepting the problem itself--the problem of decreasing attendance--and therefore resist thinking about possible solutions. They are unable to link the text assertion with their own beliefs. This form of inconsiderate text occurs when the author either fails to acknowledge conflicting ideas or fails to encourage the reader to question personally held ideas that are contrary to those assumed in the text.

5. CONTEXTUAL DISCONTINUITY BY DECEPTIVE SIMPLICITY

This type of inconsiderate text occurs when a concept with which a reader is unfamiliar is presented bit-by-bit in a sequence of seemingly familiar details. Integration of the details within the text appears to lead to envisionment of the entire text. Because the vocabulary is kept deceptively simple and the conceptual whole is not provided by the text, the reader must build an envisionment by glueing the bits to attributes of some textually plausible schema. An integration problem occurs if the reader doesn't have (or can't access) an appropriate schema, or if the text doesn't provide clues to help the reader select among possible schematic choices. The following college freshman writing text passage is an example:

> Generative or transformational linguistics assumes that all sentences of a language are based on simple subject-predicate constructions called kernel sentences. A simple set of common examples follows: "The dog is running" is a kernel sentence. The many possible transformations include "Is the dog running?" "The dog is not running," "The dog will run," "The dog has run." (Many more examples....)
>
> When basic kernel sentences are communicated, they are often transformed into more complex messages. Original thoughts might be in kernel sentences, but in speaking or writing the thought, we construct our own form of the language to fit the circumstances. Generative or transformation linguistics helps us see how speakers and writers form messages and how listeners translate them.

Although personally familiar with the working notion of transformations, students' functional knowledge often does not include its relationship to simple "subject-predicate" constructions, "kernel sentences" or their transforms. The text that provides "simple" examples is not helpful. When the reader lacks familiarity with the larger "whole" to which the "simple" parts relate, or when that "whole" is not clearly presented early in the text, knowledgeable selection of appropriate schemata is almost precluded.

Workshop on Application of Criteria for Evaluating Texts

Chaired by

Deborah Hancock

California State University, Bakersfield

Workshop Summary

The workshop briefly reviewed the criteria for evaluating texts presented by Singer, Bean, and Langer, and then used them to evaluate texts. Passages from the three texts are on the following pages. The group also discussed how the friendliness of these texts could be improved.

Passages from Texts

Passage A

The Setting

Compi is situated on the central shores of Lake Titicaca. The community can be reached from La Paz, the capital of Bolivia by the Panamerican Highway. La Paz is one of the two major destinations of the "out-migrants," and a center through which all migrants to another migration zone, the Yungas valleys, must pass.

Starting out on the high plateau or "altiplano" from La Paz at eight o'clock in the morning, this road is a series of dust clouds flying away at an angle over sweeping plateau. The trucks and buses leave La Paz at seven in the morning, or earlier, in order to arrive at the Straits of Tiquina, 100 kilometers[1] from La Paz, between 9 and 10 A.M., the time when propitious winds fill the sails of the wooden barges which carry them across the lake to the peninsula of Copacabana.

After a climb out of the basin of La Paz, the highway continues as a wide dirt road which is rather well maintained by Alliance for Progress graders. On either side of the road, peasant houses each surrounded by large house plots, ranging in size from 2 to 50 hectares,[2] lie in loose clusters separated from other clusters by vast tracts of land. Every 10 kilometers or so one passes settlements which are more nucleated, and usually of recent origin. Aymara peasants built them after the agrarian reform in order to fulfill the needs of a rapidly expanding market network and rural administration.

After 60 kilometers, one reaches the old Spanish town of Huarina from whence the road continues to Achacachi, the province capital, situated 15 kilometers from Huarina.

At this junction, the road branching off to Copacabana follows Lake Titicaca. It narrows considerably and becomes more jolting. Here population is denser, concentrated in the lower parts of valleys along the hilly shore.

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[1] A kilometer is 5/8 of a mile.

[2] A hectare contains 2.47 acres.

Buechler, Hans, C., and Judith-Maria Buechler. The Bolivian Aymara. United States: Holt, Rinehart and Winston, Inc. 1971.

Passage B

The Diary of Carolina Maria de Jesus

May 10 I went to the police station and talked to the lieutenant. What a pleasant man! If I had known he was going to be so pleasant, I'd have gone on the first summons. The lieutenant was interested in my boys' education. He said the favelas have an unhealthy atmosphere where the people have more chance to go wrong than to become useful to state and country. I thought: if he knows this why doesn't he make a report and send it to the politicians? To Janio Quadros, Kubitschek,[8] and Dr. Adhemar de Barros? Now he tells me this, I a poor garbage collector. I can't even solve my own problems.

Brazil needs to be led by a person who has known hunger. Hunger is also a teacher.

Who has gone hungry learns to think of the future and of the children.

May 11 Today is Mother's Day. The sky is blue and white. It seems that even nature wants to pay homage to the mothers who feel unhappy because they can't realize the desires of their children.

The sun keeps climbing. Today it's not going to rain. Today is our day.

Dona Teresinha came to visit me. She gave me 15 cruzeiros and said it was for Vera to go to the circus. But I'm going to use the money to buy bread tomorrow because I only have four cruzeiros.

Yesterday I got half a pig's head at the slaughterhouse. We ate the meat and saved the bones. Today I put the bones on to boil and into the broth I put some potatoes. My children are always hungry. When they are starving they aren't so fussy about what they eat.

Night came. The stars are hidden. The shack is filled with mosquitoes. I lit a page from a newspaper and ran it over the walls. This is the way the favela dwellers kill mosquitoes.

May 13 At dawn it was raining. Today is a nice day for me, it's the anniversary of the Abolition. The day we celebrate the freeing of the slaves. In the jails the Negroes were the scapegoats. But now the whites are more educated and don't treat us any more with contempt. May God enlighten the whites so that the Negroes may have a happier life.

It continued to rain and I only have beans and salt.

---

[8] Juscelino Kubitschek: President of Brazil from 1956 to 1961.

Alvez, Livraria Francisco. Child of the Dark: A Diary of Carolina Maria De Jesus. Trans. David St. Clair. New York. E. P. Dutton & Co., Inc., 1962.

Passage C

Doing Fieldwork Among the Yanomamo

. . . I was determined to work my way into their moral system of kinship and become a member of their society.

My heart began to pound as we approached the village and heard the buzz of activity within the circular compound. Mr. Barker commented that he was anxious to see if any changes had taken place while he was away and wondered how many of them had died during his absence. I felt into my back pocket to make sure that my notebook was still there and felt personally more secure when I touched it. Otherwise, I would not have known what to do with my hands.

The entrance to the village was covered over with brush and dry palm leaves. We pushed them aside to expose the low opening to the village. The excitement of meeting my first Indians was almost unbearable as I duck-waddled through the low passage into the village clearing.

I looked up and gasped when I saw a dozen burly, naked, filthy, hideous men staring at us down the shafts of their drawn arrows! Immense wads of green tobacco were stuck between their lower teeth and lips making them look even more hideous, and strands of dark-green slime dripped or hung from their noses. We arrived at the village while the men were blowing a hallucinogenic drug up their noses. One of the side effects of the drug is a runny nose. The mucus is always saturated with the green powder and the Indians usually let it run freely from their nostrils. My next discovery was that there were a dozen or so vicious, underfed dogs snapping at my legs, circling me as if I were going to be their next meal. I just stood there holding my notebook, helpless and pathetic. Then the stench of the decaying vegetation and filth struck me and I almost got sick. I was horrified. What sort of a welcome was this for the person who came here to live with you and learn your way of life, to become friends with you? They put their weapons down when they recognized Barker and returned to their chanting, keeping a nervous eye on the village entrances.

We had arrived just after a serious fight. Seven women had been abducted the day before by a neighboring group, and the local men and their guests had just that morning recovered five of them in a brutal club fight that nearly ended in a shooting war. The abductors, angry because they lost five of the seven captives, vowed to raid the Bisaasi-teri. When we arrived and entered the village unexpectedly, the Indians feared that we were the raiders. On several occasions during the next two hours the men in the village jumped to their feet, armed themselves, and waited nervously for the noise outside the village to be identified. My enthusiasm for collecting ethnographic curiosities diminished in proportion to the number of times such an alarm was raised. In fact, I was relieved when Mr. Barker suggested that we sleep across the river for the evening. It would be safer over there.

As we walked down the path to the boat, I pondered the wisdom of having decided to spend a year and a half with this tribe before I had even seen what they were like. I am not ashamed to admit, either, that had there been a diplomatic way out, I would have ended my fieldwork then and there. I did not look forward to the next day when I would be left alone with the Indians; I did not speak a word of their language, and they were decidedly different from what I had imagined them to be. The whole situation was depressing, and I wondered why I ever decided to switch from civil en-

Chagnon, Napoleon A. Yanomamo, the fierce people. United States: Holt, Rinehart and Winston, 1938.

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Workshop on Application of Criteria for Evaluating Texts

Chaired by

Dan Donlan

University of California, Riverside

Summary

I. Introduction and preliminary discussion of selected textbooks by members of the group:

   A. Owen: anthropology, sociology, history

   B. Alan: Economics

   C. Nancy: Biology

   D. Laura: World history

   E. Dan: Biology

II. Reaction to Criteria

   A. Readability

      1. If readability is too high, the text should be rejected.

      2. If readability is too low, the text should be reexamined for additional features that might make text unfriendly.

      3. Tom's criteria:[1] readability item should go to the end of the instrument. Administrators might glance at book's readability and go no further.

   B. Format Criteria

      1. Some items are not universally applicable: e.g., ethnicity of photographs, use of color, glossary (if vocabulary is carefully introduced and taught).

      2. Items on format outweigh items on organization and content (Tom's criteria). Would it be possible to weight certain items?

[1] Refers to Tom Bean's checklist, pp. 139-42.

3. An item should be added concerning how vocabulary is taught in the book.
4. The item concerning student use of text raises questions as to how this could be done, prior to buying the book for classroom use.

C. Organization and Content Criteria as related to our texts

1. Economics text organized on a macro to micro structure.
2. World history text organized by parallel and overlapping chronology.
3. Biology organized both ways: small systems to large systems (Donlan text) and large systems to small systems (Nancy's text).

III. Issues and Concerns

A. There is a trend in the social sciences toward total use of primary sources. Thus, there are no overviews, no index, no glossary.

B. Implications in learning from text by groups of differing cultural backgrounds: e.g., in Chinese text the main idea is usually located 2/3 of the way through the text; in Spanish text there is little differentiation between main ideas and supporting ideas.

C. Perhaps the best feature of a good text is its truth and authority. How can you determine how much the author of a text knows?

Workshop on Application of Criteria for Evaluating Texts

Chaired by

Thomas W. Bean

California State University, Fullerton

The purpose of this workshop session was to illustrate a sociolinguistic approach to text evaluation based on observation and analysis of classroom discussion patterns. A vibrant discussion was defined as one in which the interaction pattern flows from student-to-student (Bean, in press). Friendly text should lend itself to vibrant classroom interaction. Unfriendly text is likely to produce limited interaction and may even lead to disruptive classroom patterns.

In this workshop session, participants were provided with additional materials. They were first introduced to the steps involved in constructing a discussion map from classroom observational field notes, shown in Table 1. Field notes taken in an introductory philosophy class at two different points in the semester, Tables 2 and 3, were examined with reference to the texts being used. One text, _The Last Days of Socrates_ (Plato, 1979), Table 4, may be regarded as friendly text. It follows a familiar narrative structure and its readability is about 10th grade. The second text, _Philosophy of Religion_ (Hick, 1973), Table 5, follows an informational, expository pattern with a readability rating of graduate level difficulty. It comprised distinctly unfriendly text for freshmen philosophy students. These differential text characteristics became readily apparent when students were asked to discuss ideas in the texts.

Verbatim field notes were transformed into a discussion map format concentrating on such variables as: (1) the number of statements or questions produced by the instructor or students, (2) number of different students involved in a discussion, and (3) the level of discussion (i.e. text explicit or higher levels).

The first discussion occurred during the 10th class meeting following the use of a graphic organizer with Plato's "Apology." In this discussion, Table 2, students contributed 11 statements or questions and the instructor generated 10 for a very balanced interchange. The discussion map, Table 6 created from the notes in Table 2, shows that 9 different students participated in the discussion, often responding to each other's statements or questions. The level of discussion displayed good critical thinking with 15 of the statements or questions representing interpretive or critical levels and five operating at more textually explicit levels. In short, this discussion indicates good comprehension of the Plato text, a text that was friendly for these fledgling philosophy students.

In contrast to the Plato discussion, a later discussion during the 16th class meeting following the first two chapters of the Hick text revealed a less vibrant exchange as shown in Table 7. Students had completed vocabulary concept guides on this material. Only eight statements or questions were generated by students with the instructor contributing 19 to keep the flow of discussion going. Just three students participated with one of the three dominating the discussion. However, the level of discussion did involve critical thinking with 19 of the statements or questions representing interpretive or critical reasoning and only eight focusing on textually explicit information. Nevertheless, even with guide material, the Hick text was simply too difficult for the majority of students.

The discussion map provides a classroom based means of evaluating text selection. It is important to note that the discussion patterns displayed for these texts closely parallel predictions based on a checklist of text characteristics. The advantage of a discussion map is that it offers a view of text in action at the classroom level.

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Materials for the Workshops

Table I

Steps Involved in Constructing a Discussion Map from Classroom Observational Notes

Background

This classification form was devised to assist teachers in the analysis of classroom interaction, particuarly lesson sequences encompassing a "field-test" of a new strategy (e.g. guide material). It requires field notes or an audio tape and transcription of classroom discussion based on a participant observer's record.

The purpose of the discussion map[1] is to assist in the identification of teaching and learning patterns that may be attributable to some aspect of the classroom environment (e.g. absence or presence of adjunct text guides; use of small groups etc.). The discussion map is not a substitute for the orginial participant observer's field-notes. It systematically ignores subtle features of classroom interaction (e.g. paralinguistic cues) in order to focus on a few salient aspects of discussion. As such, it is merely an analytical tool, twice removed from the fleeting context of classroom events. Therefore, caution and common sense should be exercised in drawing conclusions or generating hypotheses from the discussion map. One should entertain and explore alternative hypotheses through follow-up interviews with the participants and additional field-testing.

Description of Categories and Directions for Coding

Meeting: Indicates that his is the first, second, third... sixteenth etc. class meeting out of X number of total meetings (e.g. 16/20).

Date: Day-Month-Year (e.g. 2/12/81)

Text: Title, Author, Publisher, Copyright date etc.

Context Description: A general overview of what the instructor and students are doing (e.g. Instructor lecture at board on photosynthesis followed by lab work in teams and large group discussion).

Guide: Indicate whether or not students have been provided with some form of study guide or concept organizer and whether or not the discussion being coded is pre or post student completion of the guide material. If no guide was used, simply indicate "none."

Line Numbers: Include line nos. in your field notes and discussion map (e.g. 001; 002; etc.).

Source: Discussion may be generated by instructors or students (use a dot (.) or initials depending upon specificity desired).

Form: Discussion may involve either questions or statements (indicate with a dot (.) in the appropriate column).

Level: Questions or statements may be classified[2] as:

Literal: Repetition of text or lecture concept

Interpretive: Making inferences and expanding upon the literal information presented in the text or lecture.

Applied: Making a connection or transfer of concepts presented in the text or lecture to other, similar or divergent contexts.

Evaluative: Making a judgment about text or lecture concepts.

Function: Discussion may be facilitated or inhibited by the functional nature of participants' statements (or responses) and questions. These classifications are designed to provide a further description of statement and question quality.

Focusing: Initiate discussion or refocus on the issue.

e.g.: "What did you like best about the story?"

or

"What was the question we started to answer?"

Controlling: Direct or dominate the discussion.

"Michelle, would you review the plot?"

Ignoring or Rejecting: Maintain current trend in discussion. Disregard a student's interest.

"Would you mind if we don't go into that now?"

Extending: Obtain more information at a particular level of discussion.

"What other information do we have about the hero?"

Clarifying: Obtain a more adequate explanation. Draw out a student.

"Would you explain what you mean?"

Raising: Have discussion move from factual to interpretive, applied, or evaluative level.

"We now have enough examples. What do they have in common?"

Sample Field Notes and Discussion Map Coding

The sets of field notes, Table 2, were collected in a Philosophy 100 class where guide materials were being field tested. First, take some time to go over the field notes and then see how they are coded on the discussion map. What conclusions can you draw from the two sets of field notes and related discussion maps? What alternative hypotheses might explain any differences apparent in the two sessions? What research questions for further testing might you generate from these two discussion maps?

Adapted from: [1] Green, J. L. & Wallat, C. Mapping Instructional Conversations - A Sociolinguistic Ethnography. In Judith Green & Cynthia Wallat (Eds.), Ethnography and Language in Educational Settings. Norwood, N. J.: Ahlex, 1981, 161-205.

[2] Singer, H. Active Comprehension: From Answering to Asking Questions. The Reading Teacher, May, 1978, 901-908.

Table 2

Field Notes on Plato's Texts

DATE: March 5, 1981

TEXT: Plato

GUIDE MATERIAL: Graphic Post
Organizer

APOLOGY and CRITO 11th meeting

Large Circle - whole group

Students need to attend Phil. symposium lecture by

Hick F (The professor): The Apology - Hist. vs.

Formal Charges

pg. 54-59
arguments against
Meletus

Middle of 59 returns to Hist. charges - defense of the Phil. life to pg.

rebuts reputations as a trouble-maker

F: What is the argument on pg. 54 - ? Michele (from role)

M: I don't really know...

Sterling: He's answering charge that Meletus is corrupting the young.

K: Everyone has a refining effort on the young except Socrates.

F: Socrates forces the argument

F: pg. 55 What is the argument?

S: A horse trainer is the only one to train horses but where does the connection occur between "horses" and the young?

F: he doesn't -- just like this kind of metaphor

horses ↔ trainers
dogs ↔ trainers
people ↔ experts on how to live well?

F: Could there be "experts" on how to live? (This questions generate all sort of applied level; personalized discussion - everyone has an opinion on this)

A: THere are experts

F: University does force expertice in specialized technical and knowledge - not WISDOM -- How to Live

F: This goes with Socrates' "interview" of craftsmen etc. -- they know craft but not much widsom re: how to live.

tells emotional story about psychiatric magazine that advertise valium etc. or "clues" for disturbances vs. having wisdom-

K: Doesn't Socrates have a sense of no truth

G: (F: grad. in June in Psy.) - Psy. grew out of Phil. (Descartes; Loche; Hume) - Freud

C: Socrates has knowledge in the sense of being able to admit some ignorance.

F: Which is wisdom

S: I don't understand how a jury can convict Socrates and honor Sophists?

F: A very good question...Difficult...

M: Socrates always takes an adversarial position in an argument - Sophists might compromise...

F: That's a contribution...

M: Socrates is a Ralph Nader type...

Table 3

Field Notes on Philosophy of Religion

DATE: 4-21-81

TEXT: Philosophy of Religion

GUIDE MATERIAL: Vocabulary
Concept Guides

(ON BOARD)

1) Ontological - Argument from God's definition

2) First Cause - Cosmological (synonymous)

3) Teleological - Argument from Design

F: Can anyone explain no. 1?

R: N. of her being greater than--two forms; it can exist or not exist.

F: That's exactly right; perfect 100%. It's possible to use different words--the argument has a long history... Albeit, younger than next two (#2 & 3 in Aristotle)...

No. 1 dates from Anselm in 12th Century

(CHAIR) VS. (CONCEPT OF CHAIR)

Anselm maintained Gods' "essence" was existence

F: Can anyone give Kant's critique?

___No one answers...

F: Gaunilon preceded Kant: An internal critique--in that he accepts premise--then says; you can define anything into existence (uses "island" example).

S: I'm confused about the whole thing--

F: We would say that "perfect" is a subjective notion. It's relative to individual preferences--Anselm used "perfect" in absolute terms. Anselm's definition was consistent w/ Judeo - Christ. Conception of God (omnicient etc.).

F: Any questions? So far...

(none)

F: Let's move on to...Hick presents Descartes' critique (Frank is referring to the text--seated on rt. side of room)

on pg. 18-19 KANT

existence is not a predicate

i.e. existence may not define what something is...

e.g. unicorn

C: A goat - reads "cud-chewing animal etc. (From Frank's paper in syllabus)

F: Would it be odd if a dictionary definition also included "existence" as a property...

F: A definition gives properties —— X = ?

F: I'm a scout for L.A. Dodgers -- at CSUF -- I find a remarkable player -- also same at USC

Jones & Smith
(CSUF) (USC)

However, Jones exists and Smith doesn't

F: If we accept "omni" properties Anselm advances--Anselm appends EXISTENCE to this list

KANT refutes this

F: Any questions before next argument?

R: Kant says non-existence wipes-out existence- if no existence, no properties

F: What makes you think he's saying that?

F: (long pause) -- So you find an inconsistency in Kant's argument...

R: If we don't know what it is -- how can Kant know...

Table 4

Text Passage from

The Last Days of Socrates[1]

Is it that I teach people to believe in some gods (which implies that I myself believe in gods, and am not a complete atheist, so that I am not guilty on that score), but in different gods from those recognized by the State so that you accusation rests upon the fact that they are different? Or do you assert that I believe in no gods at all, and teach others to do the same? 'Yes; I say that you disbelieve in gods altogther.' You surprise me, Meletus; what is your object in saying that? Do you suggest that I do not believe that the sun and moon are gods,[17] as is the general belief of all mankind? 'He certainly does not, gentlemen of the jury, since he says that the sun is a stone and the moon a mass of earth.' Do you imagine you are prosecuting Anaxagoras, my dear Meletus? Have you so poor an opinion of these gentlemen, and do you assume them to be so illiterate as not to know that the writings of Anaxagoras of Clazomenae[18] are ful of theories like these? and do you seriously suggest that it is from me that the young get these ideas, when they can buy them on occasion in the market-place[19] for a drachma at most, and so have the laugh on Socrates if he claims them for his own, to say nothing of their being so silly? Tell me honestly, Meletus, is that your opinion of me? do I believe in no god? 'No, none at all; not in the slightest degree.' You are not at all convincing, Meletus; not even to yourself, I suspect. In my opinion, gentlemen, this man is a thoroughly selfish bully, and has brought this action against me out of sheer wanton aggressiveness and self-assertion. He seems to be devising a sort of intelligence test for me, saying to himself 'Will the infalliable Socrates realize that I am contradicting myself for my own amusement, or shall I succeed in deceiving him and the rest of my audience?' It certainly seems to me that he is contradicting himself in this indictment, which might just as well run 'Socrates is guilty of not believing in the gods, but believing in the gods'. And this is pure flippancy.

I ask you to examine with me, gentlemen, the line of reasoning which leads me to this conclusion.

---

[1] Plato. The Last Days of Socrates. Middlesex, England: Raygor Readability? Penguin Books, 1979 (translation by Hugh Tredennick). 10th Grade.

Table 5

Text Passage from

The Philosophy of Religion[1]

THE ONTOLOGICAL ARGUMENT

The ontological argument for the existence of God was first developed by Anselm, one of the Christian Church's most orginal thinkers and the greatest theologian ever to have been archbishop of Canterbury.[1]

Anselm begins by concentrating the Christian concept of God into the formula: "a being than which nothing greater can be conceived." It is clear that by "greater" Anselm means more perfect, rather than spatially bigger.[2] It is important to notice that the idea of the most perfect conceivable being is different from the idea of the most perfect being that there is. The ontological argument could not be founded upon this latter notion, for although it is true by definition that the most perfect being that there is exists, there is no guarantee that this being is what Anselm means by God. Consequently, instead of describing God as the most perfect being that there is, Anselm describes God as the being who is so perfect that no more perfect can even be conceived.

---

[1] Hick, J. H. Philosophy of Religion. Englewood Cliffs, New Jersey. Prentice-Hall, Inc., 1973. Raygor Readabilty? GRADUATE LEVEL.

Table 6

Data Sheet Constructed from Field Notes in Table 2

Meeting: 11/32 Date: 10th mtg. 3-5-81 Text: Plato The Last Days of Socrates

Context Description: Post-Guide; Large Circle/Whole Gr. Guide: Grapic Post Organizer/ Apdogy + Summary Sheet

Source		Form		Level				Function					
Instructor	Student	Ques.	Stat.	L	I	A	E	Focusing	Controlling	Ignoring or Rejecting	Extending	Clarifying	Raising
F		●		●				●					001
↳	Michele		●							●			002
	Sterling		●	●				●					003
	↓ K		●		●							●	004
F	↵		●		●							●	005
F		●		●				●					006
↳	S		●	●							●		007
F	↵		●		●			●					008
F		●				●							● 009
↳	A		●	●				●					010
F	↵		●				●						● 011
F			●				●						● 012
↳	K	●			●							●	013
	↓ G		●			●							● 014

Table 6 (cont.)

Source		Form		Level				Function					
Instructor	Student	Ques.	Stat.	L	I	A	E	Focusing	Controlling	Ignoring or Rejecting	Extending	Clarifying	Raising
	C		•				•					•	015
F	↵		•		•								• 016
	Debbie	•			•							•	017
F	↵		•				•						• 018
	M		•		•						•		019
F	↵		•				•					•	020
	M		•				•				•		021
TOTALS													
10	11	5	16	5	7	2	6	5		1	3	6	6

[1] Adapted From: Green, J. L. & Wallat, C. Mapping Instructional Conversations-A Sociolinguistic Ethnography. In Judith Green & Cynthia Wallat, Ethnography and Language in Educational Settings. Norwood, N. J.: Ablex, 1981, 161-205.

Singer, H. Active Comprehension: From Answering to Asking Questions. The Reading Teacher, May, 1978, 901-908.

Table 7

Discussion Map Constructed from Field Notes in Table 3

Meeting: 16th Date: 4-21-81 Text: Philosophy of Religion

Context Description: Lecture from Board Guide: Vocabulary Concept Guides

Source		Form		Level				Function					
Instructor	Student	Ques.	Stat.	L	I	A	E	Focusing	Controlling	Ignoring or Rejecting	Extending	Clarifying	Raising
F		●		●				●					001
	R		●	●				●					002
F	↵			●							●		003
F		●		●				●					004
F			●		●							●	005
	S		●				●	●					006
F	↵		●		●							●	007
F		●		●					●				008
F			●	●					●				009
	C		●	●							●		010
F			●				●				●		011
F			●		●							●	012
F			●			●						●	013
F			●		●							●	014

Table 7 (cont.)

Source		Form		Level				Function					
Instructor	Student	Ques.	Stat.	L	I	A	E	Focusing	Controlling	Ignoring or Rejecting	Extending	Clarifying	Raising
F		●		●				●					015
	R		●		●						●		016
F →	↑	●			●							●	017
F			●		●			●					018
→	R	●					●						● 019
F	←		●				●			●			020
F			●				●		●				021
→	R		●		●					●			022
F	←		●		●							●	023
	R		●			●					●		024
F	←		●				●			●			025
	R		●			●						●	026
F	←		●		●							●	027
19	8	6	20	8	10	3	6	6	3	3	5	9	1

[1] Adapted from: Green, J. L. & Wallat, C. Mapping Instructional Conversations-A Sociolinguistic Ethnography. In Judith Green & Cynthia Wallat, Ethnography and Language in Educational Settings. Norwood, N. J.: Ablex, 1981, 161-205.

Singer, H. Active Comprehension: From Answering to Asking Questions. The Reading Teacher, May, 1978, 901-908.

An Evaluation of the Considerateness of a Biology Text

by

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Biology: Living Systems is used by students in biology classes at Garden Grove High School. Biology is an elective course and may be taken only after General or Physical Science, unless special permission is given by the instructor. It may be taken in the tenth, eleventh, or twelfth grade. Students taking this course study all levels of living organisms. Topics include cells, plants, animals and human physiology, and the major goals of the course are to give students an understanding of basic biological principles and a firm foundation for further study in biology. Readability of the text was estimated by using the Raygor method and was found to be tenth grade level. The text was also analyzed for considerateness and the findings are discussed.

On the Bean (Readance, Bean, & Baldwin, 1981) Text Evaluation Checklist, the book received a fairly high rating. It was very strong in the area of format. The book is recently copyrighted and the contents are up-to-date. The text has necessary student aids: a table of contents, a glossary, and an index. Graphs, tables, or diagrams that are referred to in the text are found on the same page as the reference. Outside readings are suggested at the end of each chapter. The conceptual organization of the text also received a strong rating on the Bean Checklist. An overview is given at the beginning of each chapter and a summary is provided at the conclusion. Difficult new words are italicized and synonyms or definitions (as well as pronunciations) are provided in the text as a new word is used. Questions provided at the end of each chapter elicit different levels of thinking. The text's one shortcoming in the area of conceptual organization is on Item 15 which states that new concepts are introduced by relating them to previously learned concepts so that the volume of new information doesn't frustrate students. While the author does attempt to relate new concepts to previously learned ideas, such an enormous amount of information is given in each chapter that the book is probably highly frustrating to students. The great density of ideas is overwhelming. At times five or six new concepts are introduced in a single paragraph. Two examples of such conceptually loaded paragraphs follow. Underlined words are those introduced for the first time in this text.

> One of the simplest and most often studied protozoa is the amoeba (Figure 13-10). Amoebae are sarcodines (sar kuk dinez), phylum Sarcodina (sar kuh di nuh), which move by means of extensions of the cytoplasm called pseudopodia (sewd uh pohd ee uh) (false feet). Such movement is called amoeboid (uh mee boyd) motion. An amoeba can form pseudopodia because of its flexible plasma membrane and its constantly moving and changing cytoplasm. The cell membrane extends as the cytoplasm flows toward it. The shape of the amoeba changes as new pseudopodia are formed and others disappear. (p. 245)

> A prokaryote has no true nucleus or nuclear membrane. It usually contains one circular chromosome composed of DNA, but no protein. Small ribosomes are present, but most of the other cell parts found in eukaryotes are absent. There are no mitochondria; cellular respiration occurs on the inner surface of the cell membrane. Chlorophyll may be present, but there are no chloroplasts. The cell wall is composed of a material called murein (myoor ee un). If flagella are present, they do not contain microtubles. (p. 237)

That students are bombarded with new terms and concepts in this text is obvious from the first example above. In the second example, only one new term is introduced, but students are expected to remember what prokaryotes are, though they were discussed only very briefly seven chapters earlier. To understand this passage, students need an understanding of chromosomes, DNA, ribosomes, eukaryotes, mitochondria, cellular respiration, chlorophyll, chloroplasts, flagella, and microtubules. It must be hoped that students have quite a background by this point in the text. Furthermore, with the rather brief explanations given to some concepts, it must be hoped that teachers spend a great deal of time preparing students for reading this text. Indeed, Singer (1983) emphasizes the importance of the teacher's role in clarifying a text and relating it to the students' prior knowledge.

Structurally, the paragraphs are fairly simple, consisting of relatively short sentences. However, a great deal of knowledge is necessary to truly comprehend some of these sentences. Consider, for example, the following:

> Euglena is an example of euglenoid that may lose its chloroplasts and become heterotrophic. (p. 243)

According to Langer (1983), a text is inconsiderate if it makes unwarranted demands on a reader. She describes several ways a text may cause cognitive gaps between the reader and the passage. The first is density of ideas, which involves the presentation of fact after fact with little elaboration and results in litle or no opportunity for readers to absorb information. This is where the present book fails for the naive reader: because of the sheer volume of material, there is very little opportunity for absorption of information.

. References

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Critical Analysis of a High School History Text

by

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The text History and Life, The World and Its People was adopted by an Orange County high school for use by non-college bound ninth and tenth graders. The text employs an informational pattern and presents material chronologically. According to the Raygor Readability estimate the text is written at the tenth grade level, a questionable level for the students who will be required to use it. The text has both considerate and inconsiderate aspects. Bean's Text Evaluation Checklist (Readance, Bean, and Baldwin, 1981) was useful in analyzing this text.

The considerate or friendly factors, those which enhance comprehension, are primarily aspects of format. History and Life contains a table of contents, an index, and a glossary. The table of contents reveals a logical development of ideas and concepts. There appears to be a more fair representation of ethnic groups and women in history than is often found in such texts. Much attention is given to cultures frequently ignored. Each chapter concludes with suggestions for further readings in other sources. In addition this text provides special sections that should be of interest to students. Sections entitled "A Mystery in History" in which legends such as that of Robin Hood are discussed are included in each unit of study. "What's in a

Name?" is another special feature which describes the origins of key words. "Someone You Should Know" is an insert which gives a personal story about an important historical figure. Map studies and time lines are also included in each unit.

This text makes use of questions both at the end of each chapter and interspersed throughout. The questions require thinking beyond the literal level as can be seen in the following examples:

> Compare Athenian democracy with democracy in the United States. Could the United States be a pure democracy? Why or why not?
>
> Which philosophy do you think would have more appeal in the United States today, the Epicurean or the Stoic? Why?
>
> Given a choice, would you rather grow up in Athens or Sparta? List reasons for your choice.

Inconsiderate factors occur both in organization of conceptual material and in the format of the text. Organizational problems occur with the use of signal words. The text makes use of signal words to prepare the reader for information to follow, yet often that information is presented at such a distance from the signal words that the signal is virtually useless as an aid to comprehension. In fact, this most likely causes confusion in the mind of the reader, inhibiting comprehension; the reader is "set up" to receive certain information then finds that it does not follow immediately. An example of this occurs on page 20 of the text. The signal word has been underlined.

> By 3100 B.C., two separate kingdoms had developed. King Menes (me' nez), the ruler of one, united Egypt and made Memphis the capital city. The reign of King Menes marked the first time in history that a strong government ruled so large an area. He also founded the first Egyptian dynasty (di'na ste), that is, the first series of rulers belonging to the same family. With the unification of Egypt, a great period called the Old Kingdom began.

The authors then continue to discuss the Old Kingdom. This discussion is followed by subsections on the Middle Kingdom, the New Kingdom, the power of the pharoahs, the class system, religion, hieroglyphics, mathematics, and medicine. Finally, the author begins another major section in the chapter with the following sentence:

> About the same time that civilization arose in Egypt, it also emerged in the valley of the Tigris and Euphrates rivers. (page 28)

Apparently the authors are going to describe the second civilization that they made reference to eight pages previously. It is easy to understand how students would become confused with this organization.

Two format problems were found in this test. First, many pictures are included to which the text does not refer. A picture of Stonehenge (page 1) begins chapter one yet no mention of Stonehenge occurs anywhere in the text. The Book of Kells, an Irish masterpiece, is pictured at the beginning of Chapter 7 (page 136); it is never mentioned in the text, nor are the Irish discussed in this chapter. Apparently pictures were selected on a random basis, having little connection with the text.

The second format problem is that too much is happening in this text. Attempts to add interesting features (mentioned earlier) has resulted in a loss of continuity. The many offset special sections are distracting to the reader. He is confronted with the decision of what to read. Should he continue with the text discourse or read "A Mystery in History" or do the map lesson? Virtually every page has a distractor.

In conclusion, though this text has many favorable aspects, there are several poor features which lower its comprehensibility. These factors need to be weighed carefully in accordance with the population for whom the book will be adopted.

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Raygor, A. L. The Raygor Readability Estimate: A quick and easy way to determine difficulty. In P. D. Pearson (Ed.), Reading: Theory, research, and practice. Twenty-sixth Yearbook of the National Reading Conference, 1977, 259-263.

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Portrait of a Friendly Text

by

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An Evaluation of Life: A Biological Science, by Paul F. Brandwein, Daniel J. Brovey, Arthur W. Greenstone, Warren E. Yasso. New York: Harcourt Brace Jovanovich, 1975.

By serendipity, Ruth Nolte and I found that our chosen textbooks were in marked contrast on the continuum of friendliness-unfriendliness, although scoring similarly on several indices.

Life: A Biological Science is intended for ninth grade biology instruction. Three passages chosen at random yielded an estimated readability of 9th grade, according to the Raygor Formula (1977).

On the Bean Text Evaluation Checklist (1981) one would give this text very high ratings for its excellent format. The table of contents, index, and glossary are easy to use. One nice feature of the glossary is the inclusion of the page number where a major discussion or illustration of the term can be found.

Graphs, tables, and diagrams are well captioned, with appropriate placement of these aids on the same page as the textual reference. These aids summarize or supplement the text effectively.

The colorful pictures and drawings are extremely well chosen to illustrate concepts being developed in the text. More than mere adornments, they provide increased comprehension and motivation for the less-than-fervent student of science.

Review questions and thought questions are placed throughout the chapter. Concepts are reviewed again at the end of the chapter and are interrelated for the reader. Sections for "Testing Yourself" and "Extending the Concepts" plus "Suggested Readings" are placed at the end of the chapter.

Projects to stimulate additional student interest take the form of "Apprentice Investigations." These draw the learner into mini-experiments with, for instance, effects of salt water on fresh water life, reactions of different plants to light, variations of light intensity with changes in latitude, and structure of a muscle cell. These investigations are well designed to take the learner from the known to the new and help the learner understand how the new information fits into the familiar.

Only item #9 on the Bean Checklist produces a negative reply. Representations of people are few in this text. One has to search diligently to find human representations except as skeletal or musculature models or as hands performing experiments. The few human likenesses other than these are more often male than female and more often white than any other ethnic group. This situation is not desirable, but is not so perilous in its impact as a history or social science text that represents white males as more significant than other groups.

> One of Singer's criteria for a friendly text is that new terms should be introduced "at a level that is familiar to the student" (Singer, 1983). This text adheres to this criteria. In addition, the text follows Bean's suggestion to use boldface type to make the new word stand out as it is being introduced via context clues and synonyms (Bean, 1983).

This text typically introduces a new term and then repeats it several times in the ensuing discussion, as contrasted with a passage from the text analyzed by Ruth Nolte that introduces several new terms per paragraph, none of which is elaborated upon. Similar readability scores would result for the two texts, since the readability formulas do not note that the high syllable-to-word ratio results from word repetition as opposed to a barrage of new terms. Hence, the difference in cognitive strain required for reading the two biology texts would be masked.

The writing is outstanding in its coherence, with clear development of ideas and their interrelations. Examples such as this abound:

> You studied Paramecium in Chapter 4 and found it to contaim many different structures. But of what are the cell's structures made? The "stuff" of which they are made has been named protoplasm, meaning "living stuff." Recall, too, that in any cell the protoplasm is identified as having at least three main structures: a cell membrane, cytoplasm, and a nucleus. Collectively, these structures make up protoplasm, the living part of the cell.
>
> What if you could get a good look at protoplasm. You might find that it assumes different forms in different cells. Generally, however, you could make a good model of protoplasm if you were to take a bit of raw egg white and mix it thoroughly with a sprinkling of black pepper. Look at the photomicrograph, on the opposite page, of an amoeba (a-me-ba) and you will quickly see the resemblance.

Concepts are presented in a non-frustrating way, with new concepts constantly being linked to more familiar concepts in a personal, informal, "talky" style, as opposed to an encyclopedia-type presentation. Practical, real-life situations are evoked to demonstrated scientific concepts. It has been noted that students prefer conversational style text with lots of examples, while unfortunately, instructors tend to prefer concise, terse writing (Pepper, 1981; Phelps and Singer, 1982).

The real difference between this text and the text analyzed by Ruth Nolte is best captured by Langer's (1980) notion of "density of ideas." When new concepts are introduced fast and furiously, the reader has difficulty constructing an overall schema for the passage. As Johnson and Otto (1982) discovered, modification of a merely stylistic nature may be of minimal significance compared to the overwhelming impact of content factors, such as the density of novel information (Phelps and Singer, 1982).

In summary, it appears that the three guidelines we've used to evaluate text overlap somewhat and that each also makes a unique contribution. A combination of them would prove useful in guiding the educated eye to selecting a text with the highest degree of friendliness possible and would pinpoint areas where the instructor must offset the text's inadequacies.

References

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An Application and Analysis of Friendly Text Criteria: Introductory Psychology Texts

by

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Researchers have identified dozens of criteria for evaluating textbooks on "friendliness." A very friendly text is easy for students to read and to learn from, whereas a very unfriendly text is unnecessarily difficult. I applied four different friendly-text scales to introductory psychology textbooks at the college level. This paper reports the results of these analysis. At the end of this paper I shall propose a pragmatic solution to the problem of applying friendly text criteria to textbooks.

Introductory Psychology Texts. I selected three introductory psychology texts for analysis. According to my preliminary, preanalytical, Gestalt judgments, (1) Wortman and Loftus' Psychology (1981) was the best text (hereafter called W&L), (2) Juanda and Klenke-Hamel's (J&KH) Psychology: Its Study and Uses (1982) was the worst text, and (3) Freedman's Introductory Psychology was almost, but not quite as good as W&L. The application of some of the text criteria required a sample of text excerpts. Therefore, I extracted excerpts on inferential statistics, memory tricks, and encounter groups from each textbook.[1]

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[1] Samples of the excerpts from these texts are in the appendix to this article.

Friendly Text Scales. I measured each textbook on the four scales or criteria that received the most attention at the conference. These scales include (1) the Singer scale which was prepared for the conference (Singer, 1983),[1] (2) the Bean scale which was based on a scale reported in Readance, Bean, and Baldwin (1981), (3) the Anderson-Armbruster (A&A) scale (Anderson & Armbruster, 1981), and (4) the Langer scale that was prepared for the conference (Langer, 1983). These four scales vary substantially in scope and emphasis. The Singer and Bean scales incorporate many dimensions and levels of text, ranging from semantic coherence at the local level to the structure and format of the entire book at the global level. The scope of the A&A scale is restricted to organization and semantic properties that span a few paragraphs. The Langer scale focuses on the cognitive demands that are imposed on the reader during comprehension and captures some properties of a schema-based theory of comprehension (see Graesser, 1981). The researchers who developed these four criteria were somewhat squeamish about quantifying their criteria in a form of a scale. They did usually have a scale (or set of scales) associated with their contributions, but they regarded their criteria primarily as guides for evaluating textbooks rather than measuring instruments. Therefore, the scales in this paper extend these researchers' work beyond their original intentions.

Each of the four scales was transformed to a proportion score that varies from 0 (perfectly unfriendly) to 1 (perfectly friendly). The Singer scale varies from 0 to 27; the proportion score was computed by dividing the raw score by 27. Similarly, the Bean scale varies from 0 to 19, so the proportion was computed by dividing the raw scale by 19. (I eliminated item 20 which required student feedback.) The A&A scale has six major subcriteria in the form of several 5-point rating scales (Steps 5 through 10); each subcriterion was converted to a proportion and the overall score was the mean of the proportions. Langer never proposed a scale, but she did introduce five subcriteria; each subcriterion was weighed equally when I computed the overall proportion.

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[1] The Singer scale reported in these Proceedings, pp. 115-136, was modified after the Lake Arrowhead Conference. It now contains 32 items in a Likert-type scale.

Results. Table 1 presents the proportion scores for the four friendly text scales and three textbooks. An overall mean for each textbook is listed at the bottom, averaging over the four criteria. In general, these proportions confirmed my preliminary, preanalytic intuitions: W&L > Freedman > J&KH. The only deviation from this ordering was in the Singer scale where Freeman was slightly higher than W&L. (There were key definitions in the margins of the Freedman book, but not in W&L.)

Table 1

Proportion Scores for Different Friendly Text Scales and Textbooks

Friendly Text Scale	Textbooks		
(Criteria)	W&L	Freedman	J&KH
(1) Singer scale	.78	.81	.67
(2) Bean scale	.95	.84	.68
(3) Anderson-Armbruster scale	.72	.66	.57
(4) Langer scale	.90	.88	.69
MEAN	.84	.80	.69

The overall mean proportion is perhaps the most accurate measure of text friendliness because it integrates over four very different scales. The Singer and Bean scales tend to emphasize global text structure and format, whereas the A&A and Langer scales are restricted to local semantic structure. If the researcher's objective is to rank order a set of textbooks on some abstract, global dimension called "friendliness," then the composite mean score would probably be the best bet for a metric. Alternatively, the Singer or Bean scale could be modified to increase sensitivity. Specifically, each item on the list could be rated on a scale (instead of a YES/NO checklist), with items differentially weighted in a sensible way.

An overall friendliness scale may have only limited usefulness. Instructors vary considerably in what aspects of textbooks they consider important and an overall friendliness score would clearly not reveal the strengths and weaknesses of a particular text. The maximum amount of information would of course be provided by a large checklist or set or ratings on every conceivable dimension, level, and perspective of text friendliness. Unfortunately, this latter approach would produce a staggering, unmanageable amount of information. Clearly, the practical solution to the problem lies somewhere between a general friendliness metric and a checklist with hundreds of items.

I would recommend that textbooks be evaluated and measured on roughly six major dimensions. Six chunks of information fall within the constraints of the human information processing system. Of course, it is up for grabs what six categories would be most natural and useful. I would select the following:

(1) Readability (e.g., Raygor, Fry, etc.)

(2) Local semantic coherence and paragraph structure (e.g., A&A, Meyer)

(3) Synchrony with students' prior knowledge (including inferences)

(4) Ease of "on-line" comprehension (e.g., syntax, Langer's dimensions)

(5) Global structure and organization of text

(6) Learning devices and special formats

I would not be surprised if research uncovers a better categorization scheme. I would also not be surprised if a quantifiable metric were established for each category.

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Sample of Excerpt from Freedman's

Inferential Statistics

Sometimes we collect data purely for descriptive purposes. We want to know the chance of getting enough tall people for a basketball team, the average IQ of incoming college freshmen, or the number of seniors applying to medical school compared to the number of places. In these instances, the mean and standard deviations may give us all the information we need. However, most of the time in psychology we want to do more than just describe one group or one variable. Often we want to compare two groups and see if they are different or discover whether a particular group differs from some known or theoretical average (for example, if a coin is evenly balanced so that it comes up heads and tails equally often). Ordinarily, descriptive statistics alone are not sufficient because we have no way of knowing whether a difference between two means should be taken seriously. We must assess whether the difference occurred by chance or is a true difference, and to do this we use inferential statistics.

The problem is that groups can have different means and yet, in truth, be identical to each other because the difference was due entirely to chance. For example, suppose you want to compare two coins to see if one comes up heads more often than the other. If you flip each of them once and one lands on heads and the other on tails, it is doubtful that you would draw any conclusions. If you flip them each ten times, and one gets six heads and the other only four, you probably still would not be likely to decide that they were different.

Sample of Excerpt from
Juanda and Klenke Hamel's *Psychology*

Inferential Statistics

Psychologists are not satisfied simply to describe their data. Even if Beth can say that the mean attractiveness of the dating choices of her low-self-esteem women is 6.25 and the mean for the high-self-esteem women is 8.08, her task is unfinished. The crucial question would be: Does this difference between the means reflect a significant difference? If Beth were to conduct the experiment with 24 other women, would she obtain similar results? If you were to flip a coin ten times, and heads appeared on six of those tosses, you would not conclude that there is a greater probability of heads appearing than tails. You would know that if you were to flip the coin ten more times, the incidence of heads and tails would probably be different.

Inferential statistics are techniques that help us to decide whether differences, such as the one Beth obtained, are meaningful. If Beth were to repeat her experiment with 24 different subjects, the mean scores of the two groups of women might differ simply through chance. The question then becomes: Is the observed difference a result of uncontrolled variables or chance factors, or is it a meaningful difference that we could expect to observe again if the experiment were repeated? Inferential statisics provide the answers to these types of questions.

Sample of Excerpt from Wortman and Loftus's Psychology

Inferential Statistics

As you learned in reading about descriptive statistics, psychologists doing research typically collect large quantities of numerical information. Looking at this data in its initial, unorganized state can be a bewildering experience for a person with an untrained eye. But by using various procedures for presenting quantitative information, psychologists can summarize even vast amount of data in forms that are meaningful, useful, and easy to convey. In many cases, however, the researchers' task is not over when they have finished "describing" their data. Often the goal of research is to explore hyptoheses, and for this purpose psychologists must turn to what are called inferential statistics.

Inferential statistics provide ground rules or conventions for determining what conclusions can legitimately be drawn from data. Remember that researchers begin with a hypothesis--a conjecture that, under certain circumstances, people (or animals) will behave in a certain way. They collect data about how a sample of people do behave under those specific circumstances, data that are in a form that can be treated statistically (scores, ratings, and so on). They then summarize their data using descriptive statistics like those discussed in the preceding section. Now they must make use of inferential statistics to infer (draw a reasonable conclusion as to) whether the data clearly support their original hypothesis. Were the results due primarily to chance, or was there indeed a significant pattern or relationship?

Choosing a History Text

by

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The historian's choice of a text is very important for achieving his or her goal in the classroom. The text will provide a structure for the oral presentation; it will supplement the lecture, embellish it, provide detail and emphasis.

The history instructor will want to find a text that is readable, neither pitched too much above nor below the class. It will have to be interesting in order to attract the less-motivated while at the same time not so popular as to make it an exercise in journalism.

Accuracy in factual presentation must be found if the text is to be credible both to instructor and student. Nothing can damage the desirability of a book more than the discovery that its author/authors have not done their homework in checking names, places and dates. Errors are bound to slip by even the most careful writer but they certainly should not appear in a second edition.

Balance in presentation is also considered as an important factor. The author must offer the reader a general survey while putting in sufficient detail of human events so as to keep the reader's attention. Listing of the regnal dates of kings in my opinion is an example of unnecessary material that belongs in an appendix but not in the body of a text.

A good work should strive to accent those events which have special pertinence to today's students. Generally the history instructor cannot cover all the material in a chapter; hence the need for the text author to emphasize those items which obviously are important to contemporary society. Both instructor and text serve as guides to the student who very often is unable to distinguish between the relevant and less important matters.

In my opinion the better texts follow a chronological rather than topical order. Some authors move back and forth between places and centuries with such rapidity that the student has only confusion as the final product. It seems best to present the past in temporal terms, since it was in these terms that people in the past understood themselves and their society.

The content of history texts will vary, but the superior text will always be distinguished by its accuracy, clarity, structure and readability.

Introducing the Writeability Concept

by

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The basic idea behind readability has always been to help writers, editors, teachers, and librarians to match the difficulty of the written materials with the reading ability of the student. A good match improves communication and learning.

This article will discuss some of the ways readability of written material can truly be increased, or to state it operationally, "how readability formula scores can be lowered without cheating". I call this process writeability.

Vocabulary

A major input of most readability formulas is vocabulary difficulty. Obviously then one way to lower readability scores is to use simpler vocabulary.

Many readability formulas include word length as measured by number of syllables or letters in an average word. This technique is based on word frequency studies which show that more common words are shorter.

Writers and editors can use word frequency lists as guides. One of the largest and most scholarly of these is the American Heritage or Carroll, Davis, & Richman (1971) list which ranks 87,000 words found in frequency counts of 5 million running words. It has largely replaced the older but still valuable Thorndike-Lorge lists. However, most writers will find these lists too expensive and cumbersome. A shorter and more useable list is the 3000 Instant Words (Sakiey and Fry, 1979) which lists in rank and alphabetical order the 3000 most used words in English. The commonness of the variant forms (adding *s*, *ed*, *ness*, etc.) is also given for each word. Even shorter word lists like the Dolch 220 Basic Sight Word of the first 300 Instant Words can be very useful to writers of primary material.

The first rule for writers then is to use more common (high frequency) words. For example, don't "prolong a process" - "keep it short". A little hint that might be helpful is that often words of Latin and Greek origin can be substituted for more common words. For example, "proceed" often means "go", "secure" often means "safe". Easier words can often be substituted for words beginning with *pre*, *dis*, *multi*, etc.

Much of what is commonly called jargon or gobbledygook is simply someone using words which are larger than necessary in order to sound pretentious or self-imposing. Military jargon is legendary. Private Smith is told to "report to" the captain's office. What they mean is that he should "come to" the captains office.

Note that in these examples a readability formula would quickly find that *proceed* and *report* are longer or less frequent than *go*.

Readability formula makers are just as aware as anyone else that there are plenty of times when the [illegible] word is necessary and should be used.[1] Longer words can add precision, clarity, and grace to an author's writing. But use too many and you will get a truly higher readability score. The result is you will cut down the comprehensibility of your writing.

A serious problem on word selection was presented to me by a group of science textbook editors on the problem of vocabulary selection. For example, they wanted to use the word "temperature" in a primary book and a work like "osmosis" in an upper level book. They argued and rightly so that it is at best awkward not to use the correct word and furthermore the student should learn to read those words. I heartily agreed and published a modification of my formula in Publishers Weekly (1979). Since that is not a widely read magazine by educators I will restate the modification here: Any term presumed to be new and difficult for readers should be:

1. Defined or used in context the first time a new word appears in such a way that its meaning is apparent and,
2. Be followed by the phonetic spelling or syllabification of the word as can be found in any commonly used dictionary for the next three times it appears. For example: syllabify (syl lab i fy) or (si lab´ i fī).
3. The new word can be counted as a 2 syllable word regardless of its length.
4. These new words should also appear in the teachers' guide, at the beginning or end of a chapter in the students' book as a new word list, and possibly in a glossary.

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[1] Fry's graph for estimating readability is on pp. 218-219.

In brief, what the author is doing is teaching the word to the reader in a very helpful and meaningful way. I'm all in favor or vocabulary improvement. I'm just opposed to bad communication which occurs when the author uses words that the reader does not know.

There is another very important type of word list and that is a list based on words known by students at given grade levels. The most impressive of these is the Living Word Vocabulary (Dale and O'Rourke, 1976) which lists meanings of words known at different grade levels. For example, the word run has many meanings. At grade 4 students know it as a baseball word, at grade 6 the way a political candidate uses it, at grade 8 to manage a business, at grade 12 as a sudden demand. No present readability formula takes this degree of complexity into account though some formulas such as the Dale-Chall do count as unfamiliar or difficult words those words not known by a majority of 4th graders. But as a writer's guide, meaning lists are valuable.

Sentences

The other major input to most readability formulas is a measure of syntactical complexity. To put it briefly they measure average sentence length. They could measure grammatical constructions such as prepositional phrases or subjunctive clauses but most of these measures correlate highly with average sentence length. Hence the obvious instruction to authors is keep your sentences short - on the average.

Nothing could be more boring reading than a long series of short choppy sentences. But on the other hand, nothing makes writing less understandable than very long sentences. You have to have variety in order to express yourself properly and to interest your reader. Short sentences hit hard. Longer sentences can have a languid flow or a subtle suggestion that the idea simply cannot be expressed without some reservations and qualifications.

Historically sentences are getting shorter. Rudolph Flesch (1974) reports that Elizabethan sentences averaged 45 words while Victorian sentences averaged 29 words. In 1949 he found that popular magazines such as Time and Readers Digest had sentences that averaged 18 words and in 1974 they averaged 15 to 17 words. He estimates that there was a 10% shortening in sentence length in 25 years, a rather hefty shrinkage.

However, just shortening sentences is not the whole answer. Critics of readability formulas have pointed out that sometimes longer sentences communicate better. For example, if you have a sentence like this:

Farmer Brown didn't go to town because the roads were icy.

Then you shortened it by having two simple sentences.

Farmer Brown didn't go to town. The roads were icy.

Then you ask a student a comprehension question, "Why didn't Farmer Brown go to town? You might find that more of them got the answer correct after reading the longer sentence. This is why readability formulas say that "on the average" sentences should be shorter for better communication. They do not say that every sentence should be short.

Incidentally, readability formulas were not meant as writers' guides. They were meant to judge the difficulty of a prose passage after the material had been written. However, this article is meant to be a writers' guide.

There are two important kinds of sentence complexity that readability formulas cannot pick up. The first is what I have referred to as the Kernel Distance Theory. Briefly it states that splitting up the subject: verb-object (the kernel of the sentence) with "distance" (extra words) causes poor readability. An example of a split kernel would be: "Children, if they don't wish to get colds, should wear mittens". An unsplit kernel would read "Children should wear mittens if they don't wish to get colds". This theory also states that distance in front of the kernel is worse than distance at the end of the kernel. For example, "If they don't wish to get colds, children should wear mittens." Note that all three sentences have the same vocabulary and the same sentence length and hence would get the same readability score but research has shown that split kernel sentences yield worse communication. Other writers would call kernel splitting "embedding".

Good examples of embedding are the "fat" sentences used by the legal profession. Basically they have too many qualifying, embedded clauses. Another problem with legal and bureaucratic writers is that they forget who the audience is. They often write to avoid law suits, not to communicate with the reader.

A second factor, and one often mentioned in rhetoric books, is that active sentences communicate better than passive sentences. Don't say, "The test was taken by the students;" say, "The students took the test". Sometimes, as in this case, an active sentence is also shorter. Klare (1980) gives a good suggestion that writers should use active verbs rather than nominalizations (verbs made into nouns). For example, the verb suppose could inappropriately be nominalized to the supposition that.

Punctuation is helpful to the reader most of the time, however a notable exception is the over-use of commas. Sprinkling too many commas in a sentence means that the flow is too choppy. It may also indicate that you have a heavily embedded sentence or one that is too long. Too many commas warn the writer or the editor that something may be amiss. Another warning sign is the use of semicolons or colons in a sentence. Modern writing uses far less of them and frequently they too signal an editor that perhaps there should be two sentences here instead of one.

Paragraphs

Paragraphs, like sentences, shouldn't be too long. On the average they should be short. Paragraphs are intended to guide the reader into seeing units of thought, gestalts, or schema. Whatever you want to call them, they should have some kind of psychological unit. When I read a master's thesis and come across a paragraph lasting for a page and a half I usually find that there is something wrong with the student's thinking or communication skills.

The old English teachers admonition about writing a well structured paragraph with main idea, supporting details, and conclusion is largely a myth. It might, repeat might, help to train neophyte writers, but it simply isn't followed by professonal writers. Take a look at Hemingway or any newspaper and you will see plenty of short, even one sentence paragraphs. Now there are times when you might want to use one of these "well structured" paragraphs but don't be bound by some ideal of paragraph structure.

Short paragraphs have punch.

Another factor related to paragraphing is the use of lists. They are particularly useful in technical writing or in directions. Lining up a list of terms or objects is often far better than stringing them all together in a sentence separated by commas. Here is another instance of too many commas being a danger signal.

Rules numbered 1, 2, 3 are easier to read when indented and lined up and they are certainly easier to refer back to.

Organization

Selecting the proper organization for an article or a chapter of a story is part of the art of being a writer. Some subject matters lend themselves more to one form of organization than another. For example, history often relies heavily on a chronological organization but very effective histories have been written which are theme or problem-centered.

One type of organization that I have found to be effective in expository writing is the SER sequence. It stands for

Statement-Example-Restatement. It is a little like the southern preacher who reported that the organization for his sermon was "I tells 'em what I' gona tell 'em. I tells 'em. And I tells 'em what I told 'em." This includes the important element of repetition but it also includes giving concrete examples and restating the principle in another way.

Subheads can make an important contribution to understanding the article and in telling the reader what organizational pattern the writer is using. Good subheads can act a little like Ausubel's advanced organizers or Rothkopf's interspersed questions. Subheads also help greatly the overview and review process recommended in SQ3R and other study skill techniques. They are used by some skilled readers to improve their comprehension or retention of the material.

Clearly written material also uses many signal words to indicate the authors organization to the reader. Signal words can indicate sequence and rank order, such as "first, second etc., next, last, in conclusion." They can indicate a reverse idea is coming up (however, but, on the other hand). They can indicate that the author is not absolutely certain (maybe, if, allegedly, might). Other words signal that an example is coming up (for example) or that ideas might be paralleled or a choice is given (or).

Personal Words

No less an august authority than the American Psychological Association condones and even at times encourages the use of personal pronouns in scholarly writing.

It is a great myth among technical writers and scientists that human being never do anything. For example, many a report concludes that "It was found that..." Who in the world is it? Chances are that it is none other than the author who prefers a literary castration of himself rather than using a personal pronoun because he thinks it is more scholarly. What he often doesn't know, even if he is a psychologist or linguist, is that not using personal pronouns communicates less well and borders on academic dishonesty. What really happened was that "I found that..." so why not say so. Stand up and take personal credit or blame and be a real person to your reader.

For those who need more convincing, here is a direct quotation from the APA Publications Manual:

> An experienced writer can use the first person and the active voice without dominating the communication and without sacrificing the objectivity of the research.

The APLA Manual also cites the American National Standard for the Preparation of Scientific Papers:

> When a verb concerns an author's belief or conjecture, use of the impersonal passive ("it is thought" or "it is suggested") is highly inappropriate. When a verb concerns action by the author, he should use the first person..."

However do not use too many personal pronouns because they are apt to draw attention away from the subject at hand and towards the author.

Personal pronouns include such words as I and you (the two best) he, she, our, and their. We is a personal pronoun and can be used if it is not a "royal we" such as kings of old, and some more modern presidents use instead of I. The royal person was just being a jargon filled pompous ass when he said "We are greatly displeased with you." What he meant was "I am mad at you". We is perfectly OK if there are coauthors writing the article or you are speaking as a member of a team.

Rudolph Flesch (1974) has developed a formula for measuring interest by using personal words and personal sentences. It is not as well known as his readability formula and the concept is not as widely accepted.

"Personal words" are:

(a) All first-, second-, and third-person pronouns except the neuter pronouns it, its, itself, and they, them, their, theirs, themselves if referring to things rather than people.

(b) All words that have masculine or feminine natural gender, e.g. John Jones, Mary, father, sister, iceman, actress. Do not count common-gender words like teacher, doctor, employee, assistant, spouse.

(c) The group words people (with the plural verb) and folks.

Personal sentences are those sentences aimed directly at the reader. For example, "You should always...".

Another type of personal sentence are the sentences used in dialogue with direct personal reference. For example, "Sally said..." or "He replied, 'Go to..'".

Personal words and sentences do not just apply to adult writing they are important in writing to children also. When sources as diverse as Rudolph Flesch and the APA Manual encourage you to use personal pronouns and personal sentences you should consider it.

Imageability

Imageability refers to the ease in which the reader can visualize the word, phrase or whole passage. Some writers refer to this as concreteness. A number of psychological studies such as those by Paivio (1969) have found that higher imageable words are easier to learn and remember. For example, high imageable words would be dog, bulldozer, mother, and low imageable words might be is, philosophy, and of. In the medium range you might find blue, running and under.

You can often improve your sentences by cutting out low imageable words whenever possible. Say, "Make the check to Mr. Jones" not "Make the check in favor of Mr. Jones". Note that 3 very low imageable words collapsed to one. This is also an example of jargon elimination.

Not just words can be ranked for imageability, phrases, sentences and whole passages can be ranked for imageability. Good writers are often adept at finding very vivid examples. Abstract statistics are brought home by a description of a typical person or product which illustrates the mean or modal finding. Writers or children's science books are often ingenious in illustrating basic principles of physics with familiar situations or home-made experiments. Pastors use stories from real life to illustrate the ten commandments and educators attempt to make teaching principles more understandable by citing actual classroom incidents.

Metaphors are an attempt to increase imageability. They often attempt to give a concrete correlary to a concept that is less visual. For example "Her personality began to unfold like a rose. It was a hard tight bud the first day on the island but each morning after the sun arose it opened a bit more until the full flower of womanhood was revealed".

You can improve imageability by adding appropriate pictures, diagrams, maps, and graphs to your manuscripts.

Anaphora

One of the things that makes some writing hard to follow is improper use of anaphora or referents. Anaphora or referents are words like pronouns such as it, they, and there. These are words which must refer to something and that something must be clearly understood usually by having just been used in the preceding sentence.

Writers use referents because they save time; it isn't always necessary to continually repeat the full noun. for example, it is a little awkward to keep repeating The Lord High Executioner when in the next sentence you can say he. When you are obviously talking about a specific baseball game on October 10th you can sometimes just say the game.

However, it is the misuse of anaphora which gets some writers into trouble. Trouble occurs when the referent can refer to two or more things. They might refer to the good guys or the bad guys and it makes a lot of difference. Also a greatly delayed referent can cause a burden on the reader's memory and momentary loss of comprehension or flow of the story. The way out of these difficulties is very simple - just repeat the noun.

Motivation and Subject Matter

One thing readability formulas will never be able to judge is the individual student's motivation to read a particular bit of writing. Some time ago I proposed The Readability Principle which briefly summarized is High Motivation Overcomes High Readability Scores. What secondary teacher has not witnessed a teenaged male student with 6th grade reading ability according to nationally standardized tests master a driver's license manual written at tenth grade readability. However, this same teenager will have great difficulty comprehending his social studies book coupled with a great disinclination to read it for very long.

Writers, if they want to be read, should find topics that are as interesting as possible. If they must write on a difficult topic they should seek examples and applications which are as interesting as possible.

This goes along with the general injunction to know your audience. Write directly to someone. Select the proper level of sophistication; then try to write just a little below that level. Best selling novels are written about the 8th grade level according to readability formula but they are read mostly by high school graduates. The reason is not that novel buyers are semi-literate or that they can only read at the 8th grade level, but rather as readability formula makers have said all along - "lower readability score means that here is an inclination on the part of the reader to continue reading the material." If business executives want their memos read or manufacturers want their instruction manuals read they better learn something from the novelist - keep the readability scores low.

It Can Be Done

Jargon isn't a sometimes problem. It has spread like the bubonic plague across the writing of every field. It is the refuge of the half-educated who prefer to cover up ignorance or uncertainty with verbosity. It is the mark of the beginner trying to worm his way into a profession. As a friend in computer science put it: "Jargon use is inversely related to true understanding". Readability formulas are affected by jargon so they do help to point up the problem. However we all must attempt to shrink this pervasive disease.

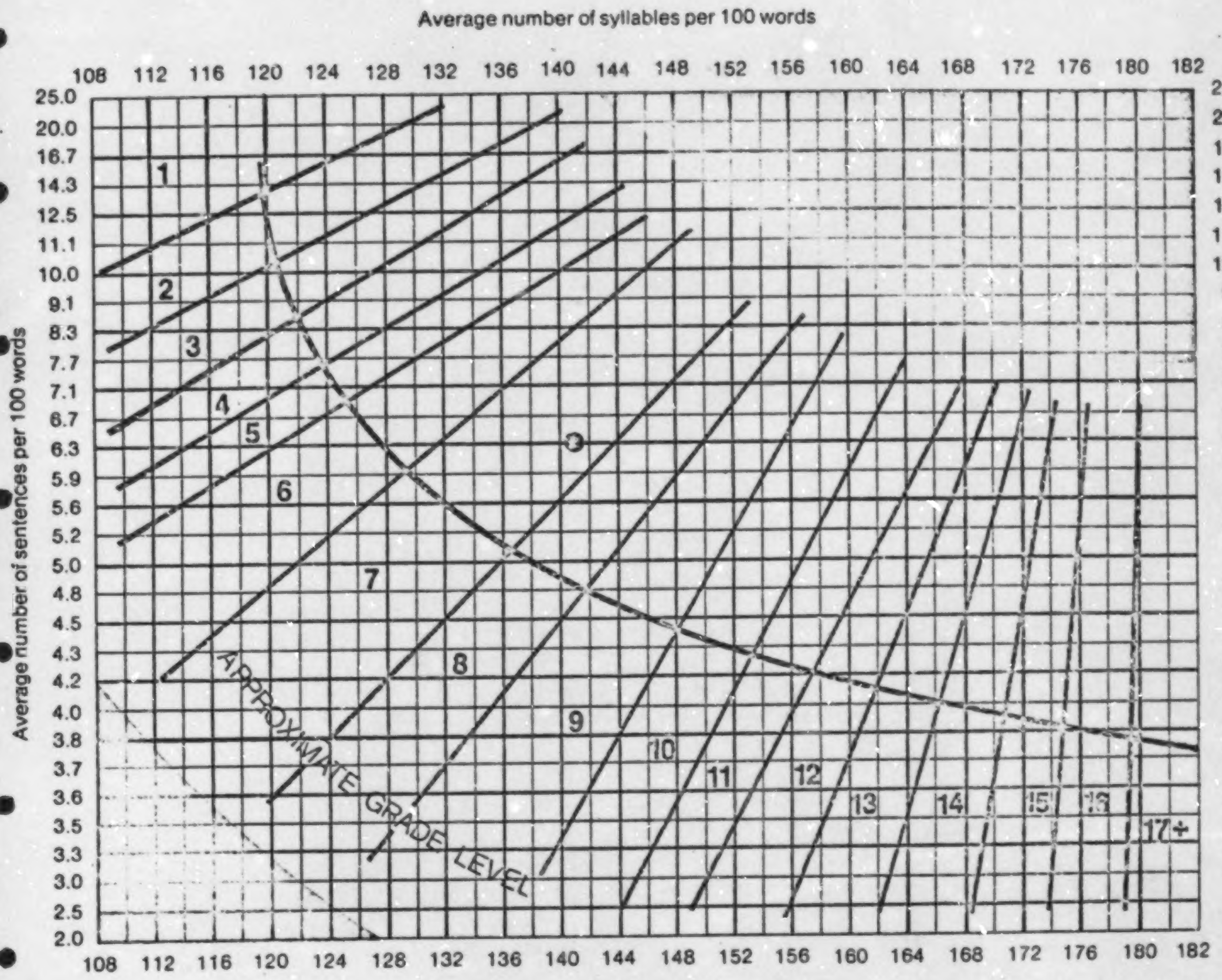
There is ample evidence that proper writing or rewriting can keep the readability of most materials lower than is commonly supposed. I recently had a masters student who rewrote part of the New Jersey Drivers License Manual as part of a masters thesis. When the readability score was lowered 2 grade levels from 8th to 6th grade level, cloze scores jumped up significantly. A surprising finding was that even though the rewritten passages were longer, the students completed the cloze tests in less time indicating that if a passage is easier to read it can be read more rapidly (Hunt, 1982).

Another student applied a readability formula to the front page story in the undergraduate student newspaper and to a front page story in the New York Times. He was amazed to find that the undergraduate written story was at the 17th grade level and the New York Times writer wrote at the 11th grade level.

Too many people write like that undergraduate and it simply isn't necessary.

GRAPH FOR ESTIMATING READABILITY — EXTENDED

by Edward Fry, Rutgers University Reading Center, New Brunswick, N.J. 08904



DIRECTIONS: Randomly select 3 one hundred word passages from a book or an article. Plot average number of syllables and average number of sentences per 100 words on graph to determine the grade level of the material. Choose more passages per book if great variability is observed and conclude that the book has uneven readability. Few books will fall in gray area but when they do grade level scores are invalid.

Count proper nouns, numerals and initializations as words. Count a syllable for each symbol. For example, "1945" is 1 word and 4 syllables and "IRA" is 1 word and 3 syllables.

EXAMPLE:	SYLLABLES	SENTENCES
1st Hundred Words	124	6.6
2nd Hundred Words	141	5.5
3rd Hundred Words	158	6.8
AVERAGE	141	6.3

READABILITY 7th GRADE (see dot plotted on graph)

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For further information and validity data see the Journal of Reading December, 1977.

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EXPANDED DIRECTIONS FOR WORKING READABILITY GRAPH

1. Randomly select three (3) sample passages and count out exactly 100 words beginning with the beginning of a sentence. Do count proper nouns, initializations, and numerals.

2. Count the number of sentences in the hundred words estimating length of the fraction of the last sentence to the nearest 1/10th.

3. Count the total number of syllables in the 100-word passage. If you don't have a hand counter available, an easy way is to simply put a mark above every syllable over one in each word, then when you get to the end of the passage, count the number of marks and add 100. Small calculators can also be used as counters by pushing numeral "1", then push the "+" sign for each word or syllable when counting.

4. Enter graph with average sentence length and average number of syllables; plot dot where the two lines intersect. Area where dot is plotted will give you the approximate grade level.

5. If a great deal of variability is found in syllable count or sentence count, putting more samples into the average is desirable.

6. A word is defined as a group of symbols with a space on either side; thus, "Joe," "IRA," "1945," and "&" are each one word.

7. A syllable is defined as a phonetic syllable. Generally, there are as many syllables as vowel sounds. For example, "stopped" is one syllable and "wanted" is two syllables. When counting syllables for numerals and initializations, count one syllable for each symbol. For example, "1945" is 4 syllables and "IRA" is 3 syllables, and "&" is 1 syllable.

FOOTNOTE: This "extended graph" does not outmode or render the earlier (1968) version inoperative or inaccurate; it is an extension.

WRITEABILITY CHECKLIST

VOCABULARY

______Avoid large and/or infrequent words
______For high frequency words use Carroll list or 3000 Instant Words
______For meaning list use living word vocabulary
______Avoid words with Latin and Greek prefixes
______Avoid jargon
______OK to use technical words but see rules for introducing new terms

SENTENCES

______Keep sentences short - on the average
______For general adults keep average sentence below 15 words
______Avoid splitting sentence kernel (embedding)
______Keep verb active (avoid nominalizations)
______Watch out for too many commas
______Semicolons and colons may indicate need for new sentence

PARAGRAPHS

______Keep paragraphs short - on the average
______One sentence paragraphs permissiable at times
______Indent and line up lists

ORGANIZATION

______Suit organization plan to topic and your purpose
______Consider SER - Statement, Example - Restatement
______Use subheads
______Use signal words
______Use summaries

PERSONAL WORDS

______Use personal pronoun - but not too many
______Use personal sentences
______A direct statement to reader dialogue

IMAGEABILITY

______ Use more high imageable words (concrete)
______ Avoid low imagery words - edit out many
______ Use vivid examaples
______ Use metaphors
______ Use graphs whenever appropriate

ANAPHORA

______ Avoid too many anaphora or referents (ex. it)
______ Replace some anaphora with nouns or verbs
______ Avoid distance between noun and anaphora
______ Don't use anaphora which could refer to two or more nouns or verbs

MOTIVATON

______ Select interesting topics
______ Select interesting examples
______ Write a level which is a little below your audience

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Learning Assistance Centers and the UCLA Project

by

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Before describing the UCLA Testing and Research Projects, I want to make a few general comments about learning assistance progams and the manner in which I think the Learning from Text Project might relate to them.

From a historical perspective, Learning Assistance Centers are merely the latest development in a series of attempts to help students succeed in college. Tutorials, "how to study" handbooks, and reading and study programs were their forerunners. As colleges began to enroll students more diverse in age, race, economic background, cultural heritage and level of academic preparation, it became apparent that increasing numbers of students needed academic support in order to succeed. Faculty were not prepared to help these students, and so they turned to the learning skills specialists.

Most learning assistance programs were developed in response to the specific and unique needs of an individual campus and, therefore, no two are exactly alike. Names, budgets, reporting structures, funding sources, staffing patterns, students served, and programs offered vary from campus to campus, but all have a common goal - to help students succeed in higher education.

I am more familiar with Learning Centers in the UC system than I am with those in the CSU system, but I believe there are many similarities between them. I think it is safe to say that faculty in both systems look upon these programs as remedial and as places to send students to be "fixed". Credit is not offered for skills development programs except in a few isolated instances were credit is arranged through an academic department. Most programs are staffed by trained skills learning specialists who are seen as practitioners rather than as researchers. They are most interested in research that might lead to improving the tools and strategies they use in day-to-day work with students. Many programs now provide support for specific introductory courses to make learning skills development more relevant for students and more acceptable to faculty.

I am impressed with the calibre of research presented at this conference, and excited with the idea of making texts more friendly. But, I can't help wondering how these ideas can be applied at UCLA. I believe our faculty will continue to choose textbooks for a host of reasons that have little or nothing to do with whether they are friendly, and I doubt that they will prepare special study guides to help students read more effectively. As I listened to the reports and worked through the sessions on evaluating friendly texts, I kept wondering how we could adapt this material to help students work with their assigned texts in our Learning Laboratory (a carry over from my days as a Learning Skills Counselor). The more I listened to the various reports, the more convinced I became that the research findings from many of the LFT projects have greater relevance to and would be more widely used by learning skills professionals. Their focus is on helping students succeed in the academic environment as it exists. We may change the environment someday, but today's students can't wait. We should disseminate our findings to Learning Center professionals and include them in our conferences.

With this brief background, let me tell you about the Learning from Text Testing and Collateral Research projects being conducted by the UCLA Learning Laboratory in conjunction with the Freshman Writing Program. Our work is in progress so I cannot give you results at this time, but we're moving in several interesting directions.

UCLA Testing Project

During the past two summers, the STEP Series II Form 1A Reading Test and the California Study Methods Survey were offered to entering freshmen attending summer orientation, and required for all students participating in summer bridge programs. Students were provided with an explanation of the tests and their scores were interpreted in relation to other entering UCLA freshmen. When appropriate, students were counseled about skills building resources available to them in the Learning Laboratory. Test scores were made available to the counselors who helped students choose appropriate courses for their first quarter at UCLA.

The Learning Laboratory recently worked out an arrangement with the Admissions Office to test all provisionally admitted students prior to the beginning of Fall quarter. Students who score low on any test will be expected to work on appropriate skills building activities in the Learning Laboratory during the academic year. We have tested well over 2000 students in all of these special programs, but knowing that they are not representative of the UCLA entering student population we could not use this group for our testing project. The testing was done to provide students with information about their abilities as measured by these tests, and to encourage them to enroll in appropriate courses and skills building programs that would help them succeed in the University.

A representative sample of approximately 200 students was drawn from freshman composition classes in Fall, 1982. The STEP II Form 1A Reading Test was administered in class; the California Study Methods Survey and Biographical Inventory were assigned as required homework. All of the testing was completed during the first week of classes - one English A Class, three English 1 classes, and five English 3 classes provided a distribution which reflects the division of incoming freshmen according to SAT scores. We are using the cumulative grade point average for students' first three quarters as the measure of success. We are in the process of analyzing the data to determine whch factors predict success at UCLA.

UCLA Collateral Research Project

Until recently, faculty at UCLA generally assumed that students could acquire information from textbooks independently, and could analyze and interpret content material critically. Reports from teachers and counselors, and the increased student demand for reading instruction in our Learning Laboratory, made us acutely aware that this assumption is invalid. We recognize the need to learn more about the reading behavior of the general college student and to discover ways by which to teach students to learn from university level texts. Our collateral research project is based on a belief that reading, writing, and thinking are inseparable activities. The purpose of our study is to access the cognitive processes used in reading and to collect information on the interaction of reading, and writing and speaking in an academic setting. The project is being conducted under the joint sponsorship of the Learning Laboratory and Freshman Writing Program. The objectives are as follows:

1. To establish baseline and trend data on the reading ability of incoming freshmen.
2. To determine how students process printed material: the metacognitive activities they use in the reading process itself, the way they process new information, and the way they relate new content to stored information.
3. To determine the reasoning processes students use for answering comprehension questions.
4. To determine the effects of personal background on reading behavior and skill level.
5. To investigate the interaction of reading, writing, and speaking.

Ten students were selected to participate in the research project: three among the highest scoring students, three among the average scoring students, and three among the lowest scoring students on the STEP test. One outstanding graduating senior was also included in the project. The CSMS Attitudes scale was also a factor in selection. The STEP series II Form 1B Reading Test was administered by the researcher to each student on an individual basis. The test has six reading passages. For two passages, students were asked to read a passage and paraphrase it or summarize it orally. Following the verbal presentation, students wrote a paraphrase or summary. In this way, we might begin to learn something about the interaction of reading, and oral and written communication. After brief "speak aloud" training, students were asked to verbalize all thoughts while reading the next two passages and responding to the test. This method should give us the most direct access to cognitive processes. In the final two passages, students were asked to read the passages and answer the questions. They were interviewed immediately after completing the task. This post hoc questioning will provide a further method of gaining access to cognitive processes. Finally, an in-depth interview covering students' personal reading history was conducted. All student responses were audio and/or video taped for later transcription and study. We have yet to transcribe the tapes, but hope to begin to do so this academic year.

We are attempting to access the cognitive processes used in reading by high scoring students, average scoring students and low scoring students, and to discover what differences might exist. This study would not be possible without the close and continuing cooperation of Learning Laboratory and Freshman Writing Programs personnel.

The Effects of Two Types of Learning from Text Guides on the Comprehension of Psychology Text Among College Freshmen

by

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Background

Freshmen students have traditionally found the transition between high school and university difficult. The principal reason is the wider range of text material from which the student is assumed to learn independently. The results from the latest NAEP report suggest that today's entering freshmen may well be less able to read and respond to text than were their counterparts a decade ago (Brown, et al., 1981). In fact, today's high school graduates may not be able to read critically nor locate text evidence to support their statements and opinions. In effect, we college instructors expect our students to have knowledge, skills, and attitudes they may not possess. For instance, in one study upper division and graduate students were unable to locate main ideas in paragraphs taken from junior high school textbooks (Donlan, 1980). Consequently, college instructors might profitably develop strategies that might help their students learn from text.

One of these strategies is a reading guide (Herber, 1970) or a learning from text guide (Singer and Donlan, 1980). A learning from text guide (LFT) is a series of questions organized to elicit increasingly complex levels of comprehension. Having students use an LFT guide helps them to progress from lower to higher levels of thinking (Bloom, et al., 1956). In addition, the guide provides a structure of the text's main ideas, thus helping the students separate the important from the trivial.

Tzeng (1982) suggests that students need to relate their personal experience to the text they are processing. By testing text content, in this case psychology text, against their own behavior and experience they can more fully comprehend the text.

Personal experience (PE) items could be appended to each level of comprehension on an LFT guide.

The problem, then, is to determine whether the learning from text guide with personal experience items affects comprehension more than does a learning from text guide without personal experience items:

$$H_1 \quad LFT + PE > LFT$$

Procedure

Sample

Seventy students from a large freshman psychology class were randomly assigned to three groups:

Group one: LFT + PE
Group two: LFT
Group Three: No Treatment

Groups 1 and 2 met for 4 one-half hour sessions over a period of two weeks. All sessons were scheduled at noon. Group one met on Mondays and Wednesdays. Group two met on Tuesdays and Thursdays. At the conclusion of the treatment all three groups were given a post test in their regular psychology class.

Treatments

Treatments for Groups A and B were identical, with the exception of the experimental variable. Each day the students were presented with a brief piece of psychology text, along with a reading and learning from text guide. Group A's guide had PE questions inserted at each of the three levels of comprehension. Group B had the identical guide, minus the PE questions. The students previewed the guides, read the passage, answer the questions, discuss the answers, and took a brief comprehension test. To insure treatments were accomplished within half-hour segments, a strict time schedule will be adhered to:

Preview - 3 minutes

Reading passage and filling out guide - 12 minutes

Discussion - 5 minutes

Ouiz and wrap-up - 10 minutes

After the completion of the treatments, all three groups were given a post-test. Data were analyzed using ANOVA.

Results

Although there were no significant differences, a trend was established:

PE + LFT > LFT > no treatment

The study is currently being replicated prior to submission of a final report.

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